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From Blast Furnace to Malleable Casting

Malleable Foundry at Cadillac Adjoins Charcoal Furnace—Suspended Molding Machines, Annealing Ovens, and Buggies for Material Handling Are Features

BY GILBERT L. LACHER

BY bridging the gaps in production from raw material to finished commodity notable economies have been achieved in American industry. Among outstanding examples, the large integrated steel companies have developed plants in which the metal passes from blast furnace through open-hearth furnace and blooming mill and to finishing mill in uninterrupted progression. Conservation of heat, of course, is one of the important advantages derived from such a unification of the steps in manufacture. Molten iron no sooner passes from the tap hole of the blast furnace into the ladle than it is transferred to a large pig iron mixer, whence it is poured into the open-hearth furnace. After the steel is made, it is cast into ingots, which are stripped of their molds as quickly as the metal solidifies and deposited in soaking pits prior to rolling.

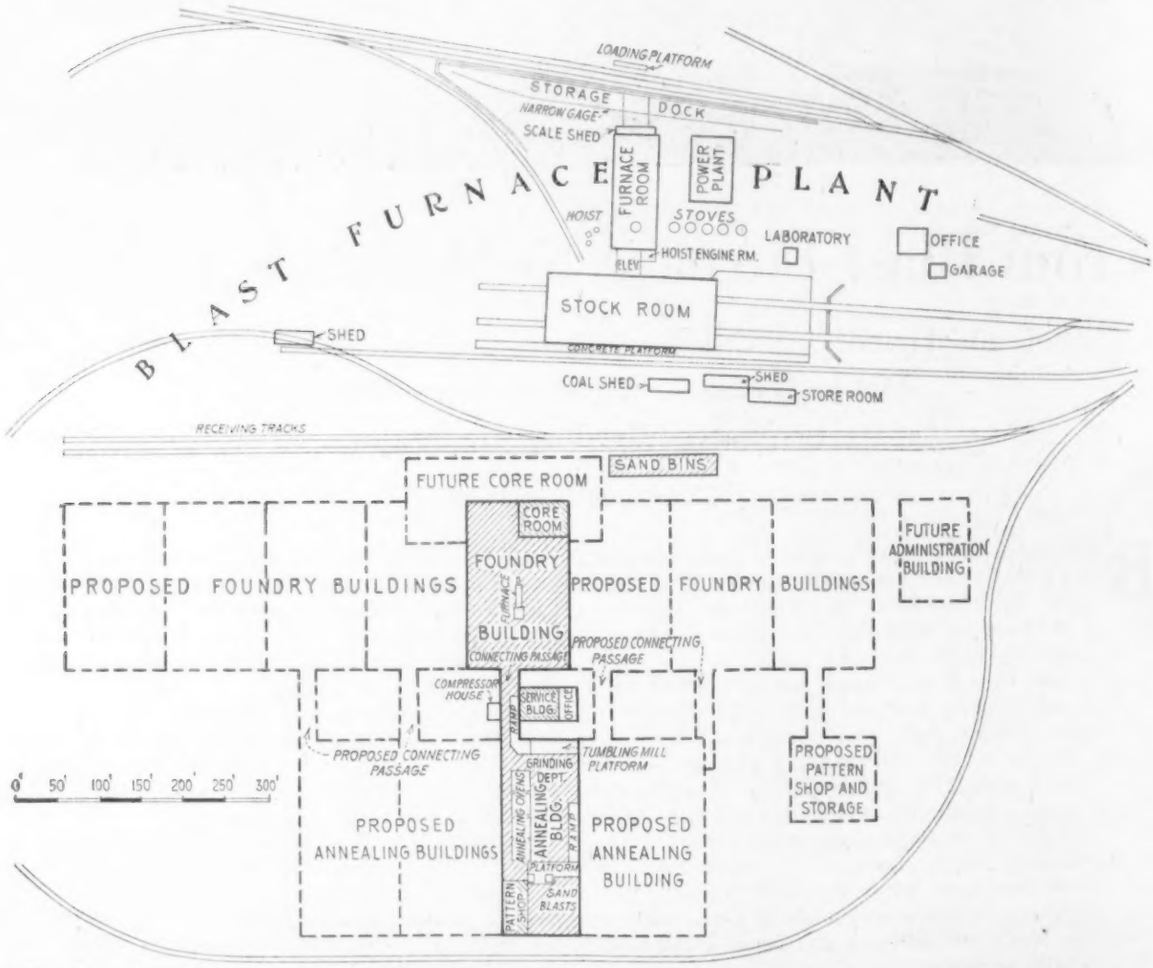
These evident economies no doubt inspired a leading motor car builder to apply the same principle to gray iron foundry practice, pouring the hot iron tapped from his blast furnaces directly into his cupolas. The prospective adoption of this idea in connection with the air furnace was one of the reasons which led to the construction of a foundry at Cadillac, Mich., by the Cadillac Malleable Iron Co. This plant was built immediately adjacent to the charcoal iron blast furnace of the Mitchell-Diggins Iron Co. and the operation of the two works, although under separate managements, have been closely coordinated.

Although the use of molten pig iron in the air furnace is not yet practicable, because the foundry's consumption is still insufficient to warrant the taking of daily blast furnace heats of the analysis required in the malleable plant, other advantages of more immediate significance have been gained from the location. In the first place, it was desired to use charcoal pig

Air-Operated Squeezer Machines Suspended From Monorails Are Used for All Molding Work. There are 31 molding floors, each equipped with a machine. The floors are narrow and long, 10 x 45 ft. each, so that molders can work at one end on cold sand while molds are being shaken out and sand is being cut over and tempered at the other. At top of page, the building with the Pond-type roof houses the foundry, while the annealing building is at the left. At right is the blast furnace plant of the Mitchell-Diggins Iron Co.

iron exclusively and this is insured by close proximity to the source of production. Likewise, economies in power, lighting and heating were made possible through the utilization of waste energy from the blast furnace plant. Finally, Cadillac is admirably situated for the production of castings for the automotive industry.

While proximity to a blast furnace is an unusual feature, it is by no means the only claim of the plant on the attention of the visitor. The layout is unusually well planned to permit future expansion. Molding equipment is admirably adapted for rapid production. The expeditious and direct conveyance of materials is insured by the layout of the plant and the handling equipment provided. The annealing department is noteworthy for its arrangement and for the late developments in design embraced in the annealing ovens.



This Plan of the Cadillac Plant Shows Its Proximity to the Charcoal Blast Furnace (at Top) and the Proposed Layout of Future Extensions

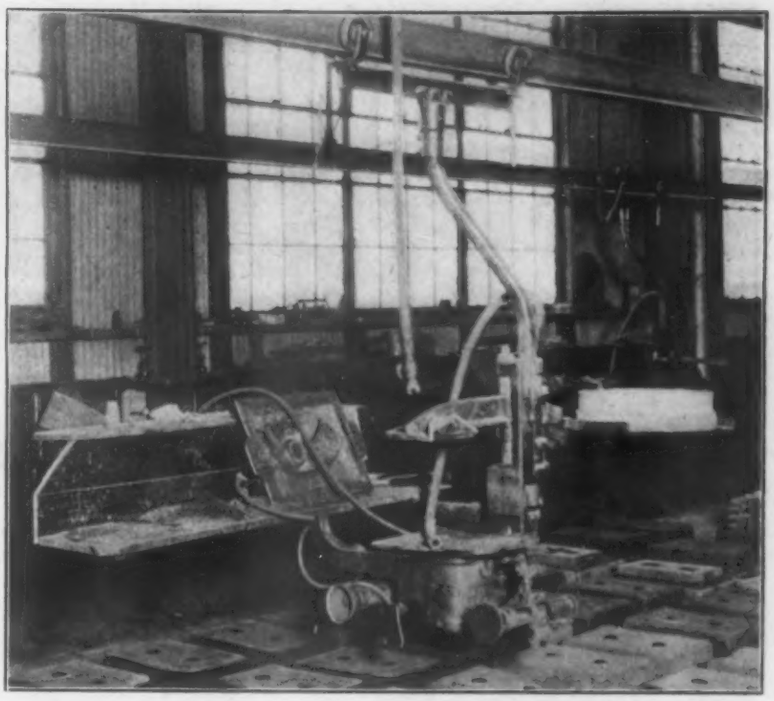
Pneumatic Molding Machines

Air-operated squeezer machines suspended from monorails are used for all molding work in the foundry. There are 31 molding floors in all, each equipped with a machine. The floors are narrow and long, measuring 10 x 45 ft. each, so that the molders can work at one end on cold sand while molds are being shaken out and the sand is being cut over and tempered at the other. This arrangement is essential in a malleable shop where two heats are taken daily. The molding machines, suspended from monorails, are of the Teetor type and were developed from the Howe suspended molding machine, which was described for the first time in THE IRON AGE of March 4, 1920, page 665. The Teetor machine, however, embraces a number of modifications from the design of its prototype.

Through an adjustable goose-neck supporting column connecting the machine with the overhead trolley, the center of gravity is thrown directly under the trolley, so that ease of movement along the rail is assured. The core bench is now held rigidly from the body of the machine and has no supporting wheel resting on the floor. It was found that the wheel, in following the irregularities of the floor, would jar the bench and damage the cores.

Another advantage accruing from the omission of the supporting wheel lies in the fact that it permits the molder to pile bottom boards in a row alongside his molding sand and directly under the course of the suspended bench. The legs of the present machine, unlike the original, may be folded up, so that molds and heaped sand on the molding floor may be cleared at will, permitting the molder to transfer his working position to any part of the floor that suits his convenience. A sand riddle has been attached to the side of the machine opposite the core bench, further to eliminate unnecessary motions on the part of the molder. The riddle, pivoted on an arm, may be swung out of the way when not in use.

The air-operated squeezer and the air-adjustable legs with broad supporting feet are substantially the same in design as in the first machine. The adjustable feature of the goose-neck support is particularly noteworthy, because it permits the machine to be turned completely around, if it is desired to reverse the direction of molding work, and also makes possible correction of the center of gravity. This is occasionally necessary when the bench is piled with heavy



As the Legs of the Molding Machine May Be Folded Up, Molds and Heap Sand May Be Cleared at Will, Permitting the Molder to Transfer His Working Position to Any Part of the Floor that Suits His Convenience. Through the goose-neck supporting column the center of gravity of the machine is thrown directly under the trolley, insuring ease of movement along the rail

cores which throw the center of gravity out of position under the trolley. Adjustment of the goose-neck is possible through collars and set screws at top and bottom.

Now the question arises as to what results are achieved with suspended machines employed in production work. Castings made from the machine-made molds range from the smallest up to 30 lb. each. In February, 1924, the average daily output of good castings per molder was 766 lb. This record is even more impressive when it is borne in mind that the foundry had to train its own molders. Cadillac is primarily a lumber and furniture center and in metal working, outside of the malleable plant, contains only a small gray iron foundry. The progress which has been made in the face of this condition commands attention. In December, 1922, the first month of operation, the plant produced 50 tons of castings. In February, 1924, the output was 256 tons.

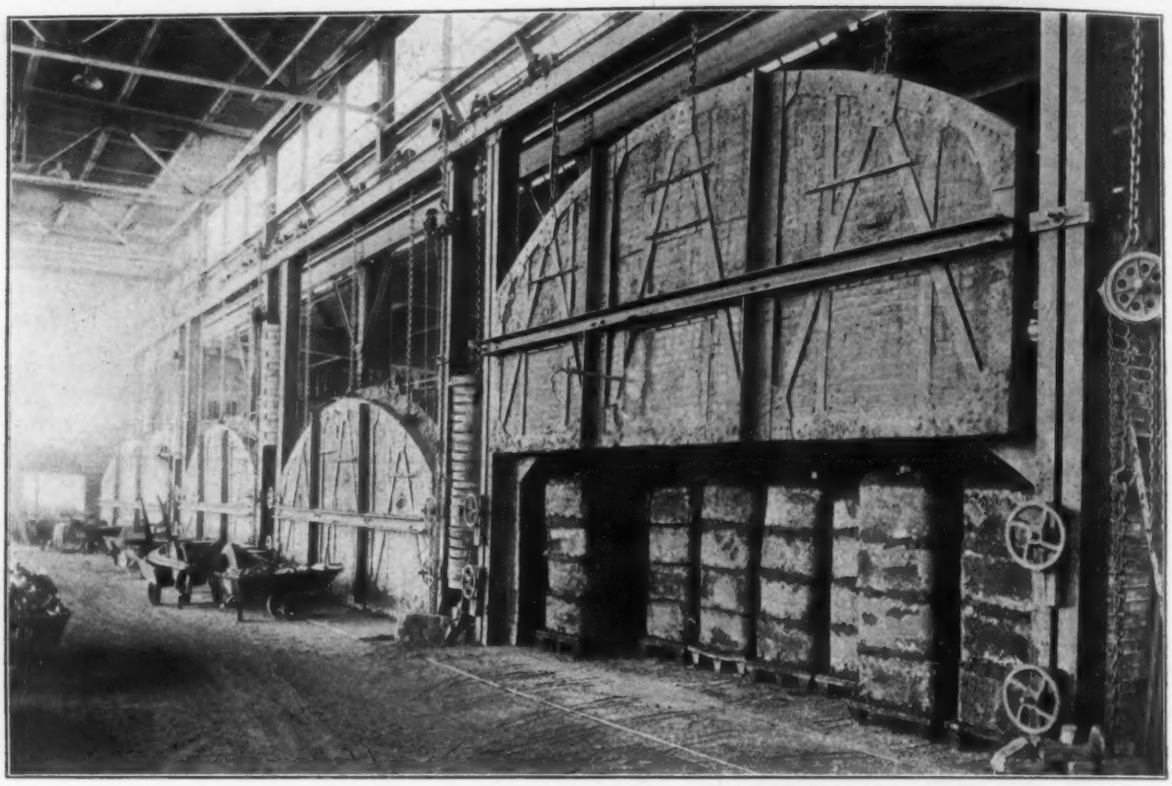
All of the columns in the molding room have electric plugs, so that connection may be made by the American Foundry Equipment Co. sand cutter when it is operating over any molding floor. Compressed air lines carry the air required by the molding machines. Air is supplied at 85 lb. per sq. in. pressure by an Ingersoll-Rand 600-cu. ft. two-stage compressor.

15-Ton Air Furnace

Located in the middle of the molding room, the air furnace was built by Holcroft & Co., Detroit. At present it is hand-fired with coal, but the management contemplates the installation of powdered fuel equipment. With a rated capacity of 15 tons, it has produced 16 tons, although no particular effort has been made to press it for output. A feature of its construction is its large bungs, which are 3 ft. in width, permitting charging with the removal of only three bungs.

For charging and for handling the bungs, the

For Charging and Handling the Bungs, the Air Furnace Is Commanded by a Floor-Operated Electric Traveling Overhead Crane



These Annealing Ovens Are Believed to Have the Largest Doors in Use, Measuring 20 Ft. Wide by 9 Ft. High at the Center. Through counterweighting, lifting can be handled easily by one workman

furnace is commanded by a floor-operated 5-ton Whiting electric traveling overhead crane. Charges of pig iron, sprues and trimmings are accumulated in three-sided rectangular trays suspended by chains. The hook from the chain on the open side is knocked out when the tray is over the furnace and ready to be discharged.

Close control of the analysis of the charge is assured through a system used for keeping track of the sprues and trimmings, which are returned to the furnace. A chemist employed jointly by the blast furnace and the foundry makes an analysis of each heat from the furnace. Ordinarily silicon is the only element which varies to an extent worthy of attention, but if irregularities are observed in the action of the furnace, that is an indication that the carbon will likewise show variance, in which case sprues and scrap from that heat are not returned to the furnace until the carbon analysis, which takes longer than the silicon analysis, is taken. Sprues are accumulated on the molding floors after shaking out, and deposited in buggies to which cards are attached indicating the heat from which they were poured. When this scrap is returned to the furnace, therefore, it is known definitely what the analysis is.

Trimmings from the tumbling barrels and sorting tables returned to the furnace are generally mixed, containing metal from both morning and afternoon heats. In this case an average is struck between the two analyses. For various reasons it is impracticable to keep the two heats separate in the tumbling department. For instance, light and heavy castings cannot be tumbled together without danger of breakage. Hence castings of both heats must be suitably sorted, grouping castings of similar size together.

As the tare weight of each buggy is marked on it, the weight of pig iron and scrap is easily ascertainable by placing the buggies on a 6-ton Howe scale located near the air furnace.

In one corner of the molding room, at the raw material receiving end of the building, is located the core department. Prominent features of its equipment are a core blowing machine, made by the E. J. Woodison Co., Detroit, used for making large body cores; a Simpson No. 1 motor-driven sand mixer, built by the National Engineering Co., Chicago. and a coke-fired Coleman core oven. Besides a main drying chamber, this oven has an emergency chamber entirely separate, with shallow drawers which may be used for the fast drying of small cores.

Core sand is dug from shallow pits in the company's own property, being used direct from pit in summer and from store in the bins in winter.

The floor of the foundry is of an entirely new type, consisting of paving brick set on sand and separated by ½-in. joints filled with cement grouting. This makes a smooth, hard floor, but does not have the dangerous fault of a solid concrete floor—of exploding hot metal. The brick is porous and allows the moisture to seep through it, in contrast with the concrete. The gangways are of wood block on concrete foundations.

The central gangway of the foundry connects with the annealing building, running straight through the entire plant from end to end. A ramp in this gangway leads to an elevated platform in the annealing department, where castings are discharged by gravity into tumbling barrels. The space underneath the ramp is utilized for storing fire clay, while miscellaneous foundry stores are kept under the tumbling mill platform.

Tumbling and Grinding

There are three motor-driven 36 x 48-in. tumbling barrels, built by the Whiting Corporation, Harvey, Ill. A dust collecting system removes from the mills all except the heavy dust, which drops to concrete bins on the floor underneath. Above and in front of the dust bins are sorting benches to which the castings are discharged after tumbling. Workmen stationed here trim and test the castings with hammers, and then sort them for subsequent grinding.

The grinding equipment, entirely motor-driven, includes one 24-in. double-end grinder, built by the

Bridgeport Safety Emery Wheel Co., and two double-end 18-in. and two double-end 14-in. grinders, constructed by the Dillon Electric Co., Canton, Ohio. The 24-in. machine is used for wheels down to 18-in. when transfer is made to the 18-in. machine in order to maintain the high peripheral speed necessary for successful grinding. The same holds true of successive diameters between 18 and 14-in.

Annealing Ovens with Large Doors

The annealing ovens are believed to have the largest doors in use, 20 ft. wide and 9 ft. high at the center. In ordinary practice the door is put in place in sections, but here the door is one solid mass, made up of steel framing and "nonpareil" brick, made by the Armstrong Cork Co., Beaver Falls, Pa. In fact, the high heat-resistant qualities of the brick made the construction of a single door possible. The door is coated on the back with a high temperature resistant cement, No. 26, made by the Johns-Manville Co., New York. Arrangements for lifting the door are noteworthy. It is suspended on two chains which are counterweighted, while a third chain from the center of the top of the door is connected with a hand-operated hoist by which a workman can lower and raise the door with ease.

To permit the expansion of the floor of the annealing oven and to insure the return of the floor to its normal position when it contracts, power springs have been placed between the oven floor and the concrete wall of a trench built in front of it. The springs are adjustable by hand screw, so that the proper pressure can be obtained. Similarly, springs have been placed in a trench in back of the oven and springs have been provided on the rear end of the roof, these being attached to tie rods extending the length of the oven.

The foundations of the ovens, which are separate from those of the building, are unusually heavy. At the base of each oven structure is a concrete slab, 12 in. thick, superimposed upon which is a massive foundation of fire brick.

Inside dimensions of the oven chamber are 20 x 25 ft. and the height from floor level to spring of arch is 9 ft. Each oven has an individual stack, an arrangement which is conducive to better heat control. The stack is located in the middle of the back end of the oven, and on each side are fire boxes in which coal is burned. Heat generated in the fire boxes passes up over a bridge into the oven chamber, whence it is drawn down through flues at the base of the two side walls. The wall flues connect with a series of parallel flues running lengthwise underneath the oven floor. The course of the circulation, therefore, is from the side walls back and forth lengthwise of the oven toward the middle, whence the gases from both sides are conveyed to the stack.

Each oven has two thermocouples, one about two-thirds of the way back on the top, and the other at the bottom of the door, the coolest point in the chamber. Temperatures from both points are recorded by a temperature recording Leeds & Northrup potentiometer—one for each oven. The aim is to keep the temperature at the coolest point at 1500 deg. Fahr.

Each of the four ovens has a capacity of approximately 40 tons of castings, or about two days' output from the foundry. Hence the four ovens, which are operated on a 10-day cycle—somewhat longer than is usual in malleable practice—handle the output of eight working days. The omission of work on Sundays and Saturday half-holidays makes the ovens amply large to handle the production of the plant. The ovens were designed and built by the Cadillac Malleable Iron Co.; the doors were designed by Frank D. Chase, Inc., Chicago.

No packing is used in the annealing boxes, the separate containers being insulated from each other through the use of flanged separator plates together with the customary mudding up of all of the joints.

Jack-Tongue Buggies Have Been Provided for Handling Material. For hand hauling a jack-tongue wheel is attached to the buggy. The jack-tongue is used also for dumping the contents of the buggy. For movement of buggies in train, smaller connecting tongues join the front bearing of one buggy with a draw-bar in the back of the buggy ahead. Here a train is being driven up a ramp leading to the tumbling mill platform

After shaking out the annealing boxes, the castings are sorted, some of them being sent to the sand blast and others to the tumbling barrels. The sand blast equipment is located on a platform connected with the annealing room floor by means of a ramp. This permits the castings to be discharged into the sand blast machines by gravity and also deposits the finished castings on the floor level, ready for packing and shipment. There are two revolving barrel gravity-type positive feed sand blast machines, built by the American Foundry Equipment Co., New York.

Beyond the sand blast department is the shipping room. A large door allows motor trucks to drive in for loading. Bins have been provided for sorting castings, small castings being bagged, while large ones are shipped loose. The shipping room has a straightening hammer, made by the Canton Foundry & Machine Co., Canton, Ohio.

Material handling facilities in the plant are excellent. There are 200 Howe-Teetor jack-tongue dump buggies, designed and patented by R. J. Teetor, secretary and general manager Cadillac Malleable Iron Co., and the late Eugene L. Howe, formerly president Standard Malleable Iron Co., Muskegon, Mich. This buggy has a body similar to that of a wheelbarrow, being adapted for end dumping, and can be moved by hand or by motor truck in train. It has two permanent wheels in back, and in front has a bearing in which a jack tongue equipped with a single wheel may be inserted for hand hauling. As all wheels run on Hyatt roller bearings, ease of movement is assured.

For movement of the buggies in train, smaller connecting tongues join the front bearing of one buggy with a draw bar in the back of the buggy ahead. Trains are moved either by electric storage battery truck or by gasoline tractor. The former, built by the Elwell-Parker Co., Cleveland, is equipped for charging annealing boxes into the ovens. It is not required for the latter purpose continually, however, and therefore is available for other uses. The gasoline tractor, made by the Clark Equipment Co., Buchanan, Mich., is used also for general service, being equipped with a 24-cu. ft. dump body so that it may be employed to haul sand, fire clay and coal.

Electric light and power are obtained from a power plant at the Mitchell-Diggins works, the steam being produced in boilers which burn surplus waste gas from the blast furnace. Similarly, exhaust steam from the power plant is used to heat the foundry. The dynamo produces 440-volt, 60-cycle, 3-phase current, which is used untransformed to operate the traveling crane serving the air furnace. Current is transformed to 220 volts, 60 cycles, single-phase for the operation of the sand cutter and other mechanical equipment. For lighting it is stepped down to 110 volts, 60 cycles, single-phase.

Radiators have been placed along the walls of all the buildings comprising the malleable plant. In addition, the foundry has an overhead hot-blast system in which the air is heated by radiators, both the hot-blast system and the radiators supplied by the American Radiator Co.

Buildings and Extension Plans

The foundry building is 120 ft. x 198 ft. and has a Pond-type roof, the peaks of which are 40 ft. above grade. Continuous sash has been provided in the monitors and side walls. Prepared roofing over roof boards covers the structure except over the air furnace, where cement tile, supplied by the Continental Cement Tile Co., Chicago, was used instead of wood. Brick trim has been used on the ends, while the sides are of false construction to permit later expansion. The false walls are made of asbestos wood siding, bolted onto the steel work.

Plans provide for the construction of three molding rooms on one side and four on the other side, each identical with the present foundry, so that, if contemplated expansion finally eventuates, there will be eight air furnaces with a total recorded capacity of 120 tons.

Expansion of the annealing building will take place in both directions also. A new battery of ovens will be built opposite the present battery to serve the next foundry addition, and then subsequent batteries will be constructed back to back with those two. In other words, only four annealing buildings of the present size will be required to take care of eight molding rooms. The annealing building is 90 x 228 ft. and is 35 ft. high from floor to roof, barring the portion which houses the ovens, which is really a leanto adjoining the main structure. The latter has a flat arch roof covered with roof boards and composition roofing. The floor is paved with wood block; the side walls have continuous sash.

Next to the gangway connecting the annealing building with the foundry is a service and office building, 40 x 67 ft. In the expansion plans, this structure will eventually be used entirely for toilet and locker facilities, and a separate administration building will be built elsewhere.

The plant is served by a railroad siding owned jointly by the Ann Arbor and Pennsylvania railroads. Next to the siding are a sand storage building, 24 x 126 ft., and a coal storage yard. A motor-driven continuous conveyor built by the Chicago Automatic Conveyor Co. and suspended from a trolley rail is used for handling coal and sand in the material yard. The sand storage building is of frame on concrete foundations and contains three bins, each having a capacity of four carloads. The bins have high windows for unloading from open cars and doors on the level of box car doors for unloading from closed cars. The sand bins are steam heated in winter.

Frank D. Chase, Inc., Chicago, was engineer in charge of the design and supervised the construction of the plant. Fabrication and erection of the steel work was by the Indiana Bridge Co., Muncie, Ind. The Cadillac Malleable Iron Co. was organized June 1, 1922, and the officers include: J. C. Ford, president; C. T. Mitchell, vice-president; R. J. Teetor, secretary and general manager. and G. G. Brown, treasurer.

Secretary Hoover's Reply to Mr. Untermyer

WASHINGTON, March 25.—Secretary of Commerce Hoover has made a vigorous reply to charges by Attorney Samuel Untermyer, who, in a recent letter to Senator Capper, of Kansas, bitterly assailed Mr. Hoover in connection with recommendations made by the latter to Senator Capper for an amendment to the Webb-Pomerene export act. The proposal of Mr. Hoover, which has been acted upon by Mr. Capper, calls for the setting up of common purchasing agencies of American importers of essential raw materials which are controlled by foreign monopolies. Mr. Untermyer charged that Mr. Hoover, while trying to control foreign monopolies, had protected domestic monopolies.

Mr. Hoover, replying to Mr. Untermyer in a letter to Senator Capper, charged that Mr. Untermyer "is either engaged in slander or he is losing his memory, or knows nothing of the functions of the Department of Commerce, or he is endeavoring to oppose efforts to restrain foreign price combinations."

Mr. Hoover made the point that the Department of Commerce has nothing to do with the law against combination in restraint of trade and that if Mr. Untermyer had any complaint to make it should be addressed to the Federal Trade Commission or to the Department of Justice.

Close Manufacturing Limits Discussed

Practical and Impractical Requirements Cited—Good Practice in Establishing Tolerances—Reasons for Difficulty in Producing Smooth Running Gears

THE necessity of specifying manufacturing tolerances judiciously was emphatically brought out by B. H. Blood, general manager Pratt & Whitney Co., Hartford, in a paper on "Some Limitations on Manufacturing to Close Limits," read at the machine tool conference held March 25 under the auspices of the Engineers' Club of Philadelphia and the Philadelphia section of the American Society of Mechanical Engineers with the cooperation of the machine shop division of the American Society of Mechanical Engineers. The

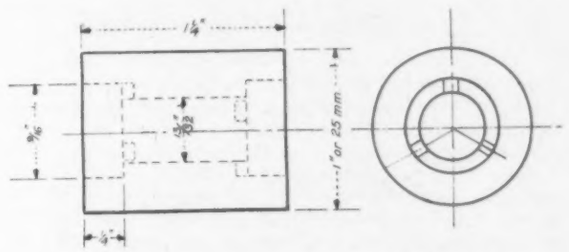


Fig. 1—Dimension Sketch of Steel Cylinder

conference was held at the Engineers' Club, Philadelphia.

The facts brought out by Mr. Blood are summarized in the following:

In order to manufacture to close limits, it must be possible to measure to still closer limits.

The measuring means should be as direct as possible.

Even where direct and accurate means of measuring are available, close work is expensive and should be called for only where the expense is justified by the requirements.

Tolerances should be set only after a careful study of their necessity and their cost. If right, they should be adhered to. If not, they should be changed.

Cumulative tolerances should be avoided. In placing a tolerance figure on a drawing, the draftsman should consider how it can be checked, the observational error of the measuring instrument, and the influences of tolerances on other related dimensions. Dimensions should read from fixed and accessible points.

Greater clearances usually permit greater tolerances. If both can be increased with safety, economy is bound to result, and in many cases the product may be actually improved thereby.

Coming as the author does from a shop whose business and reputation have been built on precision manufacturing, this doctrine may sound strange. Dirt has been defined as any matter out of place. How shall we describe precision out of place?

In manufacturing to limits the first essential is to be able to measure, not merely to those limits but much more closely. The great majority of manufacturing operations in metal consist in removing surplus stock. To hold to any specified limits it is only necessary to stop at the right point. Our means of measuring must show us how closely we are approaching that point, and warn us before we pass it.

Thirty years ago very few machinists had ever seen a micrometer. Close dimensions were expressed on drawings in sixty-fourths of an inch. A drawing with sizes and tolerances expressed in thousandths would not have been intelligible. Yet the skilled mechanic worked in thousandths without knowing it. He would produce a drive fit, a sucking fit, or a running fit that was entirely serviceable, if he had the nicety of touch and the patience to do it. It took skill and time. He did not even aim at interchangeability.

However, the general adoption of the micrometer, perhaps our most useful measuring instrument, has changed all this. The skilled mechanic has become the toolmaker and devotes his time and skill to providing the means whereby the unskilled operator produces by hundreds the parts of mechanisms which assemble without fitting. Better means for making close measurements have called for better means for manufacturing to close limits, and these in turn have called for still greater refinements in measuring instruments.

Specifying Tolerances Which Cannot Be Checked

It is unfortunate that many people have come to speak familiarly of thousandths and ten-thousandths without any conception of what those quantities mean in metal. Take, for example, a ring gage, nominally one inch. By holding it in the hand a few moments it can readily be warmed 16 deg. Fahr., which would expand it a ten-thousandth. Take also a plug which fits the gage very freely, so that it can be felt to shake, and place a strip of cigarette paper one-quarter inch wide and one-thousandth thick, between the plug and the ring; the result will be a tight fit. Take another plug which will just drop through the ring by its own weight, and a third plug, which is just half a ten-thousandth larger, will fit so snugly that it will not shake off. A fourth plug, whose diameter is greater by another half ten-thousandth, will not enter the ring dry. By coating the surfaces with light oil the plug will enter the ring and slide freely as long as it is kept moving, but when it is allowed to come to rest for a moment the two are apparently frozen together, and cannot be broken apart.

There are no satisfactory means for measuring the diameter of this ring except by measuring the diameter of a plug on which the ring fits. But which one of these plugs does the ring fit? It must be that the oil

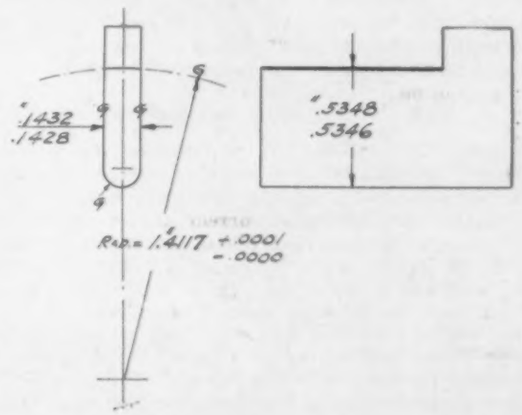


Fig. 2—Steel Blade Used for Punching Armature Disks

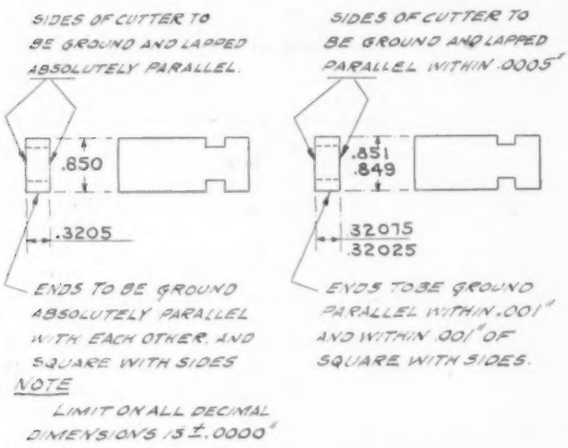
film has some thickness, and yet the plug would not enter the ring without oil. It appears that the ring is actually stretched by the oil film.

This illustrates the difficulty of manufacturing to close limits when we have no direct means for measuring. We frequently send out plug and ring gages which have a "freeze fit," and the customer returns them, claiming that the ring is smaller than the plug because he cannot get them together. The plug is capable of direct measurement, and measurements by different operators and in different laboratories, using different instruments, will agree more closely than some would believe. But who can say what is the inside diameter of this ring? We can expect no agreement on this point. Yet draftsmen will calmly place on their

drawings tolerances which cannot possibly be checked, and leave the gage maker and the inspector to fight it out. Too often this is done conscientiously, in the belief that high-class work is thereby assured.

Good Practice in Establishing Tolerances

Precision in manufacturing is not a thing to be set on a pedestal and worshipped. It costs money and time. Where it is necessary to the proper functioning of a mechanism it is worth whatever it may cost. In most mechanisms which require close fitting there are but few critical dimensions which need be held to close limits. For any manufacturing operation the tolerances given should be the widest which will assure satisfactory operation, but no wider. Anything closer than that is economically unsound. It is particularly



Figs. 3 and 4—Original and Revised Drawings of Cutter, Showing Changes in Tolerances

unwise to place close tolerances on a drawing and then permit deviations by special dispensation. If work outside of established tolerance is usable, it proves that that tolerance is too close and should be widened in the interest of economy. Adherence to the established tolerances can usually be assured by correctly designed limit gages. The gages should be made inside the limits but as close to them as practicable, first cost and maintenance both being considered. They should then be used as fixed limits. The "Go" gage should go and the "No Go" gage should not go, and no gage should be forced, otherwise its life will be short.

Two Examples of Close Measurements

Let us consider some actual examples of close measurements which have been made, and some which could not be made, at least at any reasonable cost.

The Pratt & Whitney company recently made some thread gages for an automobile manufacturer, for which a definite gage-maker's tolerance of 0.0002 in. in pitch diameter was given. The customer rejected them as undersize. On checking them it was found that they were within tolerance, and they were accordingly sent back. The customer again rejected them, giving his readings on each individual gage. The author took them to the Bureau of Standards for checking. Using 5 lb. pressure on the anvils of their measuring machine, over wires laid in the angle of the thread, their readings checked those of the author's concern with a variation of 0.00001 in., or one hundredth part of the thickness of a cigarette paper. Their readings were within the specified tolerance. But when using only 2 lb. pressure their readings were 0.00014 in. larger, a difference of two-thirds of the specified tolerance. The customer specified no conditions of temperature or pressure under which the gages should be measured, yet a reasonable variation in either one would have made all the difference between acceptance and rejection of the work.

The author's company has made up a set of 24 steel cylinders as shown in Fig. 1. They are of steel, highly finished, and according to our readings the greatest variation from 1 in. diameter at 68 deg. Fahr. was +0.000002, —0.000000. They made a similar set of 25-mm. cylinders. The measurements in both cases were made by the interferometer, based on Professor Michelson's determination, some 30 years ago, of the number of cadmium-red light waves in the international meter, and the ratio between the inch and meter established by Congress in 1866.

Six of each lot of cylinders were sent to the National Physical Laboratory at Teddington, England, for checking. They were measured on the millionth comparator, against their own standard inch which was derived from the British imperial yard stick. They worked at their standard temperature of 62 deg. Fahr., making the necessary correction for expansion at 68 deg. Fahr. It was found that the cylinders would yield 0.000004 in. under the anvil pressure of 2 lb. which they used. The British inch is 3.3 millionths shorter than the inch used by our Bureau of Standards. Making corrections for these factors, their average reading for the six cylinders varied from that of the author's company by 0.8 of one millionth of an inch. The agreement on the metric cylinders was even closer, coming within 0.4 of one millionth of an inch.

Close Tolerances in Commercial Work

Consider now some practical examples taken from everyday commercial business. Fig. 2 is a steel blade used by the thousand in a large shop for punching armature disks. The tolerances are close, but not particularly troublesome, with the exception of the radius 1.4117 with a tolerance of +0.0001, —0.0000. The author's company knew of no means by which this dimension could be measured or checked, and therefore refused several times to bid on the work. The purchaser resented this, saying that the parts had been made for several years from the same drawing, both in their own tool room and in four outside shops, without ever having a rejection on this point. Asked how the radius was checked, no answer was forthcoming. But the purchaser finally agreed to remove the tolerance figures from this dimension, and to accept any

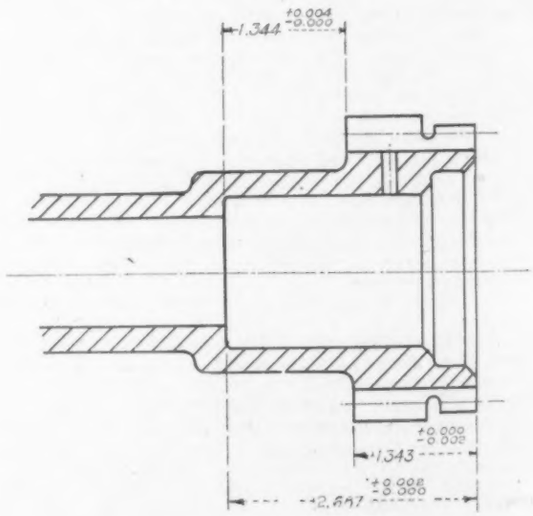


Fig. 5—Tolerances on an Automobile Transmission Gear

product which they could not prove wrong. One may wonder why the figures were ever placed on the drawing.

Fig. 3 shows another piece, used in some quantity, on which a quotation was asked. Tolerances where given were close but possible. In quoting the author's company interpreted ±0.0000 to mean that these dimensions were to be held within 0.00005 in., which could be done. "Absolutely parallel" was somewhat comprehensive, but the company offered to hold this to 0.000005 in., for we could measure that. "Absolutely square" corners could not be measured, but they undertook to hold this to 0.0001 in. on the short dimension, as an error of this magnitude would show daylight when an accurate square was applied.

The customer came back with the statement that

the company's price was high, "probably because their tolerances were too close." He inclosed a revised drawing (Fig. 4) on which the tolerances were about ten times those the company had asked. A price was then made which was about one-third that originally quoted, and the order was obtained. In the first instance the pieces would have had to have been lapped and measured in a constant-temperature room. The change made it a fairly simple job of grinding. The customer saw what his unnecessarily close tolerances would cost him.

Example of Impractical Requirement

The following is an inquiry for gages, apparently for ordinary shop use in a plant building motor trucks:

We request standard list prices and best discounts on double end reversible plug gages of your standard design made up to the following tolerances:

Gage Tolerances (One Way or Total Tolerance)

Class	Go	No Go
A	.00002	.00002
B	.00004	.00004
C	.00006	.00006
D	.0001	.0001
E	.0001	.00015

No statement is made as to how or at what temperature the gages would be measured, nor as to the

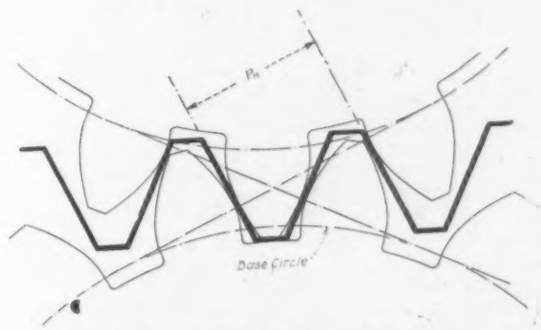


Fig. 6—Two Spur Gears Meshed With Each Other

diameters required. The tolerance of 0.00002 on a 1-in. Class A gage represents the change in size which would be caused by a temperature change of 3 deg. Fahr., or on a 2-in. gage by 1½ deg. Fahr. Such gages, though expensive, can be supplied, but of what use would they be in the shop? An hour's use would wear them out of tolerance. Notice also that in one case the gage tolerance on the "No Go" is greater than on the "Go." It should obviously be less, because the "Go" gage wears, and it wears *toward* the limit if its tolerance has been properly placed, while the "No Go" gage, if made within limits, wears *away* from the limit. It can wear but little unless forced, and there is no inducement to force it because to do so rejects work which might pass. It is logical to make the gage-maker's tolerance on the "No Go" half as great as on the "Go" member.

Why Production of Smooth Running Gears Is Difficult

The shop drawings of a certain automobile transmission gear gave the dimensions and tolerances as shown at the bottom of Fig. 5. The only important dimension is from the shoulder to the bottom of the hole, shown at the top. This did not appear on the drawing until a lot of gears had been spoiled. The end of the gear fitted nothing and might have varied a thirty-second of an inch. The tolerances as originally placed made it necessary to hold two dimensions, one of them quite unimportant, to a tolerance of 0.002 in. each, while the revised figures above gave a single dimension with a tolerance of 0.004 in.

Smooth-running gears are about as difficult to produce as anything which passes through the machine shop, chiefly because of the lack of means for measuring the one essential dimension. Outside diameter, tooth thickness, backlash, eccentricity, etc., can be directly measured, but they are of secondary importance. Various involute testers have been devised, but they do not give directly the controlling dimension. In fact, the truth of the involute is not important so long as the two mating tooth forms are conjugate; that is, for perfect action each must generate the other.

Fig. 6 shows two spur gears meshed with each other. The heavy line represents the straight-sided basic rack from which the involute teeth are generated and with which they will run. The perpendicular distance P_n between the parallel faces of two adjacent rack teeth is the normal pitch, which is the perpendicular distance between two parallel planes making simultaneous contact with two adjacent tooth profiles. It is equal to the developed length of the arc on the base circle subtended by one tooth. It determines the angular movement of the gear while that tooth is in action. If the tooth spacing is not uniform this angular movement varies. If the mating gears are not conjugate in form and of the same normal pitch, the driven gear will either be bumped ahead or allowed to drop back as each tooth of the driving gear comes into action. An error of 0.0001 in. in normal pitch is of the same order of importance as an error of 0.001 in. in any other dimension of the gear. This is only beginning to be appreciated. The author has a beautiful booklet, issued about a year ago by the makers of one of the best-known fine cars in America, featuring their ground transmission gears, which it is claimed are held to an accuracy of 0.0005 in. A gear having an error of 0.0005 in. in normal pitch would be rejected by most makers of second-rate cars.

Device for Direct Measurement of Normal Pitch

Fig. 7 shows an instrument devised to give, for the first time, a direct measurement of normal pitch. It consists essentially of two plane parallel faces, *A* and *B*, corresponding to two rack teeth the distance between which is variable and readable in ten-thousandths by means of a multiplying lever and dial indicator. By means of this it is possible to tell before removing a gear from the grinding machine whether it will run smoothly with any other gear whose normal pitch is known, and make corrections if needed; also to match up any gear of which there is a record. This is offered as an illustration of the value of direct means for measuring any dimension which must be held to close limits. Until this instrument was developed it was

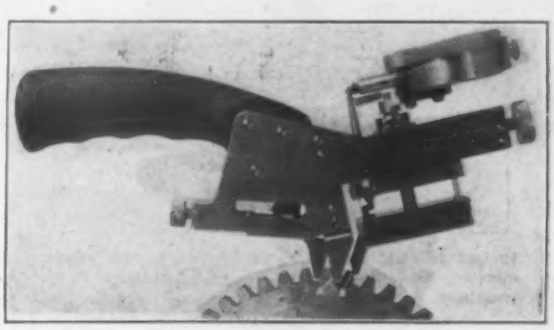


Fig. 7—Instrument for Direct Measurement of the Normal Pitch of Involute Spur Gears

not possible to tell whether a gear would be satisfactory until it had been run with its mate. If it was not there was no way of telling what correction was needed. The one critical dimension could not be measured.

Two new types of induction motor are now being marketed by the General Electric Co. The SCR single-phase motors are designed for constant speed at 60, 50 or 40 cycles, in sizes from ⅛ to 10 hp., and are interchangeable for 110 or 220 volt circuits. The KT-900 type is a riveted frame, polyphase induction motor, of three- and two-phase squirrel cage, 60 cycle design, and is being sold in sizes ranging from ½ to 15 hp.

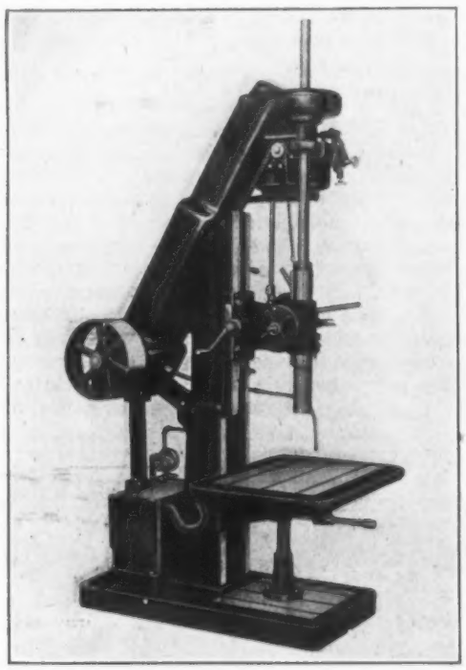
Morris Shapiro, Baltimore, subject to his tender being accepted by the court, has purchased the Groton Iron Works, New London, Conn., at auction, for $203,000. The property purchased heretofore was used for the construction of vessels.

New All-Geared Drill and Tapper

The all-geared sliding-head drilling and tapping machine illustrated, designated as the No. 263, has been added to the line of the Barnes Drill Co., Rockford, Ill., taking the place of the former 26-in. unit having the same swing. A self-oiling system has been added and radial bearings provided for all shafts in the speed-change transmission, including crown gears and drive shaft bearings. Eight geared speeds and eight geared feeds are available. The machine may be equipped either with the square column and rectangular table shown, or with a round column and table.

Other features include a spur geared feed, which is emphasized as eliminating the usual worm and worm gear and saving considerable replacement expense. The reduction in the spur geared feed gives finest feed of 0.005 in. per revolution of the spindle. The speed changing gears are cut from bar stock chrome-nickel steel, heat treated and tempered.

The method of attaching the rack to the spindle sleeve is also regarded as an improvement, screws and dowels having been eliminated and the rack dovetailed into the sleeve and keyed in position. This is intended



Radial Journal Bearings for Speed Change Transmission, Including Crown Gears and Drive Shaft Bearings, Are a Feature. Spur geared feed is used, and the rack is dovetailed into the sleeve

to eliminate the trouble caused by screws and dowels working loose.

The machine is rated to drive a 2-in. high-speed twist drill at 0.041 in. feed per revolution of the spindle or at the rate of 6½ in. per min. in cast iron, without the back gears. It is claimed to drive a 1-in. high-speed twist drill at the rate of 13½ in. per min. in cast iron. Suitable feeds are available for boring bar work, the machine being rated to bore out an 8-in. or larger hole. The spindle is 1⅛ in. in diameter and is double splined.

For tapping, a reversing friction clutch gear giving a reverse speed of 1¾ to 1 is employed and these gears are on the driving shaft of the machine rather than on the spindle. A trip may be set so that when the top reaches the depth required the spindle will reverse automatically, backing out at increased speed. The shifting lever may be set so that when tripped it will return to neutral position, stopping the spindle instead of reversing it.

Direct motor drive may be applied, a 5-hp., 1200-r.p.m. motor being recommended. The floor space required for the machine is 24 x 49 in., and the height is 94 in. The weight of the No. 263 drill is 2000 lb. net.

Five Societies to Participate in International Management Congress

Arrangements for American participation in the international management congress, to be held at Prague, Czechoslovakia, July 21 to 24, are in the hands of representatives of the Taylor Society, management division of the American Society of Mechanical Engineers, American Management Association, Society of Industrial Engineers, and National Association of Cost Accountants. Engineers interested in management, but unaffiliated with these societies, are also invited to attend. The secretary of the committee in charge of arrangements is Dr. H. S. Person, managing director Taylor Society, 29 West Thirty-ninth Street, New York.

The five general subjects to be considered at the congress are: Management in general, industrial management, management in quasi-public basic industries, management in public administration, and education of management.

Pittsburgh Safety Meeting

Preventing accidents and conserving health will be the two main topics discussed at a safety conference of the engineering section, National Safety Council, to be held in Pittsburgh, April 1, under the auspices of the western Pennsylvania division of the National Safety Council.

The general topic of the morning session will be "Safety Committees—their Organization and Maintenance." John A. Oartel, Carnegie Steel Co., will be chairman and J. M. Woltz, Youngstown Steel & Tube Co., will speak on "Safety Committees Will Die, Unless Fed. What Shall We Feed Them?" Other speakers include C. B. Auel, Westinghouse Electric & Mfg. Co., whose address will be on "Accident Records—What to Keep and How to Keep Them."

"What Is Industry Doing to Cut Down Time Loss on Account of Illness," is the topic to be discussed at the afternoon session, at which C. J. Stein, M. D., medical director, Philadelphia will be chairman. Among the speakers at the session will be A. W. Colcord, M.D., chief surgeon, Clairton Works, Carnegie Steel Co., who will address the conference on the subject of "Infections."

Lists of Dealers and Importers in Foreign Countries Are Compiled

WASHINGTON, March 25.—The Commercial Intelligence Division, Department of Commerce, has compiled trade lists of dealers and importers in foreign countries, copies of which may be obtained from the Bureau in Washington, or any of its district or cooperative offices. Among the list are the following: Iron and steel, importers and dealers, Egypt, NE-14034-A; automobile body builders, British South Africa, BE-6052; automobile tops and bodies, builders, Canada, BE-1042; body builders, top builders, New Zealand, FE-24034; automotive products, importers and dealers, Germany, EUR-4006; automotive products, importers and dealers, Austria, EUR-15007.

Lt. Col. Walter C. Sweeney, general staff, U. S. A., will be the guest of the Boston branch National Metal Trades Association at Young's Hotel, Boston, Tuesday evening, April 1. During the first year of the war, Colonel Sweeney was at General Pershing's headquarters and subsequently chief of staff 28th Division during the Meuse-Argonne drive. He is now intelligence officer first corps area, comprising the New England States. He will deliver an address at the meeting on the radical and revolutionary elements as they exist today in the United States.

The production of gears by special grinding machinery is to be discussed before a meeting at Toledo of the American Society of Mechanical Engineers on March 20 by R. S. Drummond, vice-president Gear Grinding Machine Co.

New Radial Drilling Machine

Convenience of operation, inclosed gearing, "fool-proof" elevating mechanism and simplified lubrication are among the features of the new 6-ft. radial drilling machine recently placed on the market by the Dreses Machine Tool Co., Cincinnati.

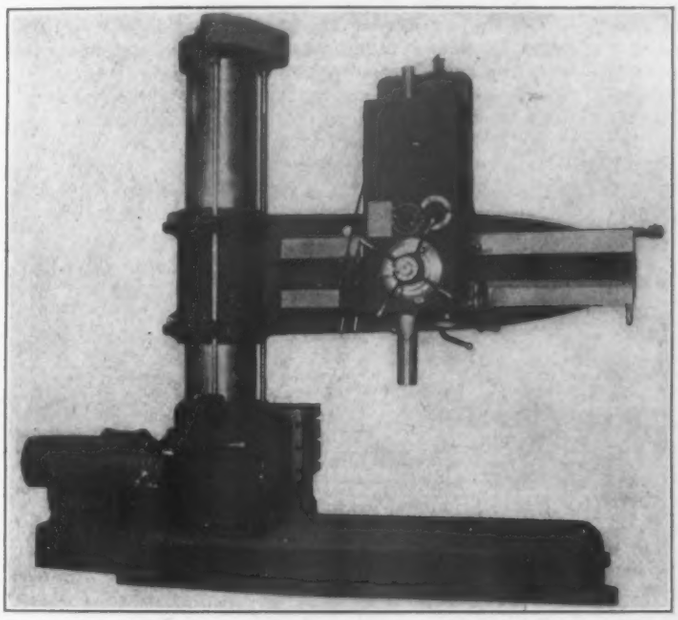
The head is entirely inclosed, as shown in the illustrations, and is mounted on three bearings, two in front and one in back of the arm, a construction intended to distribute the torsional strain over the entire arm when drilling. It is clamped by means of a lever at the lower left corner, which actuates two widely separated screws, drawing the head up firmly against the lower guide rail and assuring proper alinement of the spindle. The traverse of the head is obtained by means of the hand wheel at the lower right-hand corner, operating through a full ball-bearing traverse mechanism.

Lubrication of the head is by means of a combination of splash and force feed systems. The forward and reverse gears, and frictions run in a separate oil bath. The back gears and spindle drive gears are oiled by means of a pump which takes the lubricant from a reservoir, pumps it through a glass sight on top of the head, then cascades over all gears and bearings and finally returns to the reservoir, where it is filtered and recirculated. The spindle and all feed and traverse mechanisms are oiled by means of a tilting hopper, which distributes a predetermined amount of oil taken from the circulating pump supply. The hopper is manually operated by means of a lever conveniently placed on the outside of the head. The operator merely turns the lever down, holds it an instant, and then releases. It automatically returns to its former position.

The spindle runs in renewable phosphor-bronze bearings and thrust is taken on ball bearings. The rack is cut directly on the heat-treated alloy steel spindle sleeve, which is intended to assure wide bearing for the rack pinion, and bring the point of pressure close to the center. The rack pinion, which is of alloy steel, heat treated, has a special form of tooth which is said to eliminate the usual undercut below the pitch line on small diameter pinions.

The tapping, starting and stopping mechanism is of the frictional type, embodied in the head and operated by the horizontal lever shown below the arm. There are four changes of speed in the head, obtained by two levers placed at lower left corner. This, combined with eight changes in the speed box, gives 32 spindle speeds. The driving gear, with two long tool steel keys for driving the spindle, rests on an annular ball bearings placed inside the gear, avoiding overhang.

There are 15 feeds to spindle, five of which are tap leads. They are instantly available and prominently indexed, showing feed per revolution of spindle. The arrangement includes a safety friction interposed in the drive, in addition to the large friction quick return. The quick return clutch is adjustable from the outside with a screwdriver. It is operated by any one of four levers. The automatic trip and depth gage is positive in its functioning. The dial is graduated in even divisions to avoid complicated reading should the depth desired exceed one complete revolution of the rack pinion. The trip may be set to disengage the feed at any position in the range of traverse. All depths are set to read from zero, and the trip may be passed at any set position by a pull knob. A positive safety trip is provided at each end of spindle travel.



New 6-Ft. Radial. The head is entirely inclosed, and is mounted on three bearings, two in front and one in back of the arm. Lubrication of the head is by a combination of splash and force feed. Convenience of control and safety provisions are features

The miter gears in back of the arm and inside the column are drop forgings, heat treated, and are mounted in ball bearings. The long hub of the gear which drives the vertical shaft in the column is fitted with a longitudinally yielding contact, intended to eliminate improper meshing of the gears, prevent the weight of the heavy shaft riding on the gear teeth, and compensate for wear between the column and stump.

The arm is of box parabolic shape. One lever unclamps, elevates or lowers, then securely clamps the arm by a single movement. It is unnecessary for the operator to leave his position in front of the machine. In addition to a safety device intended to eliminate accidental engagement of the elevating mechanism while the arm is clamped, the gearing automatically disengages should any obstruction be met in elevating or lowering.

All operating levers on the head are within a radius of 17 in., yet are not crowded, each lever affording ample hand room and operating clearance. The operating levers at the base of the column, including the speed box, the column clamp, the new combination arm clamp and elevating handle, are also within a 17-in. radius.

Three different standardized interchangeable drives are available: belt drive and constant speed motor drive, both through speed variator; and variable speed motor drive.

CUPOLA PRACTICE AND MIXTURE

Quad City Foundrymen Listen to Address by J. H. Hopp of Chicago

"Cupola Practice and Iron Mixtures" was the subject of an address by J. H. Hopp, vice-president Charles C. Kawin Co., Chicago, before the Quad City Foundrymen's Association at a meeting at the Le Claire Hotel, Moline, Ill., Monday evening, March 17. The cupola as a melting unit was discussed primarily from the viewpoint of generally accepted practice as to manner of operating and suggestions were made with a view to improving the operation, mainly through securing as much economy as is consistent with the paramount function of the cupola, that of furnishing hot iron.

The subject of tuyeres, as well as the devices for supplying air to the cupola, which is necessary to bring about quick combustion of the coke, was dealt with at length. The effect of the metal on the temperature due to lighting the cupola too far in advance of the time of blast was touched upon. It was recommended that the charges be somewhat in accordance with the ladles used for removing the iron from the cupola to the various parts of the shop in order that each tap might be considered as a completed melted charge. It was recommended that the blast be shut off as far in advance of the dropping of the cupola as practice and observation from day to day would permit, for the purpose of preserving the lining, which otherwise is destroyed by prolonging the blast, especially when the cupola has almost entirely melted the metal charged into it.

In discussing the subject of coke ratios, the speaker placed little credence in the general statements made by some melters of iron that they are able to melt 10 and even 12 pounds of iron for each pound of coke, in view of the fact that shops melting very large tonnages —in fact, to the extent of 850,000 lb. per day—are unable to maintain a ratio greater than seven and one-half pounds of iron to one pound of coke. Normal conditions in shops of small tonnage indicate that the ratio of coke to iron is invariably under this figure.

On the subject of mixtures suitable for various classes of castings, the speaker said that calculation of mixtures to obtain satisfactory results is by no means a simple problem in arithmetic. Figures were read to prove that under as good a condition as one generally finds it is possible to have a very wide variation in the silicon content of the metals and still the average may be very close to a predetermined figure. The elements in iron were discussed individually and in joint combinations, together with the effect, both good and bad, of mechanical corrections in the molding to offset what the metal seems to lack.

On the subject of the strength of cast iron, Mr. Hopp cautioned foundrymen not to be too hasty in accepting specifications which are recommended to them from all directions, as too frequently these specifications are narrowed down too fine to be adhered to successfully in actual melting practice.

Sulphur, in the speaker's opinion, is an overemphasized bugaboo, as many defects and losses and difficulties encountered in everyday practice are erroneously attributed to this single element.

Wide extremes in the texture and machining quality of castings tend to upset the theories and practice of the machine shop and should be guarded against, said Mr. Hopp in his concluding remarks.

Boston Steel Treaters

Approximately 200 members and guests of the Boston chapter of the American Society for Steel Treating were the guests of the Trimont Mfg. Co., Roxbury, Boston, Friday, March 21. During the afternoon there was an inspection of the plant under the supervision of Harrison B. Parker. In the evening there was a dinner at which H. E. Handy was toastmaster. Speakers of the evening included W. S. Bidle, president W. S. Bidle Co., Cleveland; William Patterson, vice-president Trimont Mfg. Co.; Prof. Victor Homerberg, Massachusetts Institute of Technology; R. J. Allen, metallurgist Rolls-Royce of America, Inc., Springfield, Mass.; and Dr. R. S. Williams. Mr. Allen went at some length into the application of heat treating in the automobile industry, and remarks by the other speakers were largely confined to the heat treating industry.

Rochester Steel Treaters

The March meeting of the Rochester chapter of the American Society for Steel Treating, to be held Friday evening, March 28, in the rooms of the Rochester Engineering Society in the Carnegie Building of the University of Rochester, is to be addressed by Walter G. Hildorf, chief metallurgist Reo Motor Car Co., Lansing, Mich., formerly professor of metallurgy at the Michigan State Agricultural School. His subject will be "The Metallurgical Control and Heat Treatment of Steel Used in the Manufacture of Automotive Vehicles." This will be the first cooperative meeting of the Rochester chapter with the Rochester Engineering Society.

Tri-City Technical Council Organized

Plans have been completed for the organization of the Tri-City Technical Council, which is an association of the Technical Societies in the Tri-Cities. The following organizations are represented in the council: American Chemical Society, Illinois-Iowa Section; American Society of Mechanical Engineers, Tri-Cities Section; American Society for Steel Treating, Tri-City Chapter; Davenport Engineers' Club; Quad-City Foundrymen's Association.

Representatives from the above organizations composed the committee on organization. The following temporary officers were selected: Chairman, H. Bornstein, Deers & Co., Moline, Ill.; vice-chairman, Howard Rogers, Williams-White Co., Moline, Ill.; secretary-treasurer, Harvey Soverhill, Davenport Locomotive Works, Davenport, Iowa.

One of the principal purposes of the organization of the Council is to increase the civic activities of the technical men and organizations of the Tri-Cities.

Meeting of Committee on Gage Steels

A meeting of the gage steel committee was held at the Bureau of Standards, Feb. 16, sixteen members representing gage manufacturers, steel makers, Army and Navy ordnance departments, technical societies and the Bureau being present. The completed work of the committee was discussed and further work planned. It was agreed that the work had progressed sufficiently far to warrant practical service tests and with this object in view the secretary was directed to present the work of the committee before the automotive industries in order to secure their cooperation. If the cooperation of these industries is secured, it will make possible the carrying out of service tests rapidly because of the extensive and heavy use of gages in automobile manufacture. Plans were made for the immediate determination of the effect of the more important variables involved on the wear of gages.

Meetings of Mechanical Engineers

Among meetings scheduled by sections of the American Society of Mechanical Engineers are the following:

Newark, N. J., April 15.—Subject: Standardization of Punches and Dies. Speaker, Sidney Diamant.

Cleveland, April 16.—Subject: Centerless Grinding. Speaker, G. W. Binns, Cincinnati Milling Machine Co.

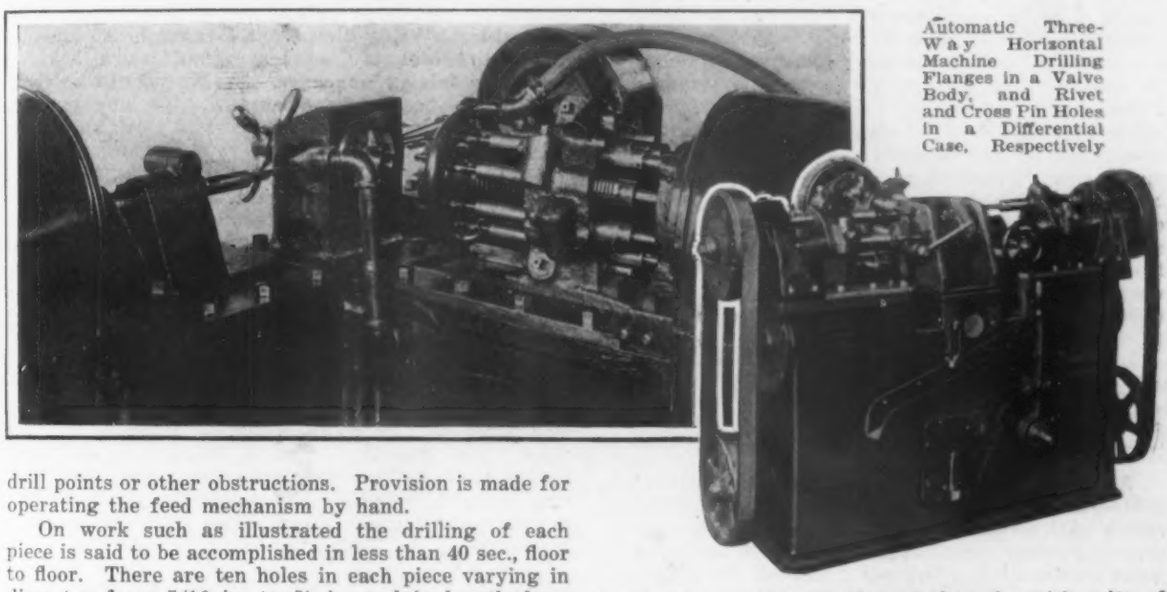
Toronto, April 16.—At Mining Building, University of Toronto. Subject: Forging and Heat Treatment of Steel. Speaker: Prof. O. W. Ellis, metallurgical engineering department, University of Toronto.

Toledo, April 17.—At Chamber of Commerce. Subject: Accurate Measurements. Speaker, W. H. Weingar, Willys-Overland Co.

Three-Way High-Speed Drilling Machine

The automatic three-way horizontal drilling machine shown in the accompanying illustrations is a recent development of William K. Stamets, Pittsburgh, and is intended for high speed drilling. The illustrations show the machine as adapted for two jobs, one showing the drilling of three flanges in a valve body, the other, a close-up view, the drilling of rivet holes and cross pin holes in a horizontal case.

In this machine the feed is obtained by means of drum cams providing for quick travel, slow feed, and quick return to the drill carriages. Feed changes are made by means of change gears, which are located accessibly. The main feed gears are inclosed and run in oil. Quick adjustment of the drill spindles to take care of different length drills is obtained through sleeve rack and pinion. A clutch provided in the feed mechanism is automatically tripped at the end of the drilling cycle or it may be manually operated at any time. A friction safety device incorporated in the feed works is intended to prevent injury due to dull drills, broken drill points or other obstructions. Provision is made for operating the feed mechanism by hand.



Automatic Three-Way Horizontal Machine Drilling Flanges in a Valve Body, and Rivet and Cross Pin Holes in a Differential Case, Respectively

On work such as illustrated the drilling of each piece is said to be accomplished in less than 40 sec., floor to floor. There are ten holes in each piece varying in diameter from 5/16 in. to ⅝ in. and in length from ½ in. to 1 in. The floor space required for the machine is approximately 4 ft. x 5 ft., which is considered unusually small for the work produced. The machine is motor driven and weighs about 3500 lb.

Burr Foundry & Machine Acquires Humphreys Machine Co.

The Burr Foundry & Machine Co., recently incorporated under Massachusetts laws with a capital of $65,000, has acquired the Humphreys Machine Co., Keene, N. H., and will operate its foundry, machine and pattern shops on a general line of work. No additional equipment is required at present. Officers of the Burr Foundry & Machine Co. are David E. Burr, president and treasurer; Shields Burr, vice-president and general manager, and Charles R. Cabot, secretary.

David E. Burr is a graduate of Cornell University in mechanical engineering. During the war he was captain of engineers and holds that rank in the engineers' reserve corps. He has had wide experience in sales and finance and recently resigned the presidency of a contracting company, a position he held for ten years, to devote his entire attention to the affairs of the Burr Foundry & Machine Co. Shields Burr is a Massachusetts Institute of Technology man with wide experience as an industrial engineer and foundry expert. He was for several years general manager Aetna Foundry & Machine Co., Warren, Ohio. Charles R. Cabot is a member of the bar and formerly an assistant attorney general of Massachusetts.

The address of the company will be Keene, N. H., with a sales office at 950 Park Square Building, Boston.

Combustibility of Coke

The subject of the "Combustibility of Coke" was the title of a lecture by Dr. H. Bähr of the plant of Otto & Co., Dahlhausen on the Ruhr, Germany, which was reported by *Stahl und Eisen*. A brief account of the lecture and the discussion which followed is given by *Engineering*, London, part of which follows:

Some coke chemists have recently spoken of combustibility of coke, by which they mean the power of the incandescent coke to reduce carbon dioxide, as distinct from the general combustion. Since the combustion of coke depends upon the equilibrium between carbon, oxygen, carbon monoxide and carbon dioxide, and since this equilibrium reaction changes with temperature, pressure, surface development and other conditions, there is not much gained by this distinction, nor by the term reactivity of coke generally used, and which Dr. H. Bähr prefers to combustibility. Dr. Bähr found that the reactivity was not affected, or only very slightly, by the volatile constituents and the porosity of the coke, though these factors influenced the ignition temperature. Impregnation of the coke with salts of alkalis, magnesium and aluminum had no influence, either; but impregnation with iron salts increased the reactivity, which decreased again when the iron salts were extracted by means of acid. This catalytic influence of iron on the combustion of coal and coke is not surprising; it has been recognized for some time that even the small amount of mineral constituents, very finely disseminated through coal, affects the combustion more than one would expect from the proportion of the mineral constituents, which are, therefore, said to act as catalysts. The lecturer does not suggest that coke might be improved by soaking it in solutions of iron salts; the necessary redrying of the coke would make any advantage gained illusory. But his lecture led to an animated discussion from which one may conclude that coke combustion requires much further investigation. One of the speakers mentioned that he had apparently improved his coke by mixing it with dust from the throat of a blast furnace, but combustion had become irregular.

Ohio Foundry Operations

Ohio foundries operated at 74.1 per cent of capacity during February as compared with 74.4 per cent during January and with 66 per cent during February, 1923, according to the monthly report of the Ohio State Foundrymen's Association. These percentages are based on 100 per cent capacity of all the foundries reporting. Stocks on hand declined from 85 per cent in January to 78 per cent in February. Operations of non-ferrous foundries in Ohio increased from 63.5 per cent in January to 66 per cent in February. This compares with 75 per cent in February last year.

CINCINNATI METAL TRADES

Annual Meeting Listens to Addresses by President Coleman and Others

The twenty-fourth annual meeting of the Cincinnati Branch, National Metal Trades Association, was held at the Hotel Gibson, March 20. The principal business was the election of officers for the coming year, and addresses by W. W. Coleman, president of the National Association, and Fred R. Marvin, associate editor of the New York *Commercial*. The election of officers resulted as follows: President, J. Wallace Carrel, Lodge & Shipley Machine Tool Co.; vice-president, E. A. Muller, King Machine Tool Co.; secretary, D. C. Jones, Lunkenheimer Co.; treasurer, Louis G. Freeman, Louis G. Freeman Co.; directors, J. A. LeBlond, R. K. LeBlond Machine Tool Co.; L. B. Easton, Worthington Pump & Machinery Corporation; and J. B. Doan, American Tool Works Co.

President Coleman, of the National Association, spoke of the promising tendency in industry today to create a better understanding between all classes of workers. We must keep in mind, he said, that industrial associations are voluntary cooperations, and must be operated for the common good. The standard of living among workers can only be improved by cheapening costs of production, and this in turn can be accomplished by greater efforts of workers and better machinery. Increases of wages are insufficient to bring about this result. Wages should be as high as economic conditions permit, but they cannot be standardized. The only proper basis on which wages can be paid is, in his opinion, the worth of the individual worker. The form of contact between the management and the workers is a most important factor in better relations. The standard must vary according to circumstances, but one of the best methods yet devised is thoroughly trained foremen representing the management. Individual workers, however, must be given opportunity to get in touch with management, and the same applies to employees as a whole. The unemployment problem is important and he was confident that some solution to this would be found. The regulation of production would help considerably. Speaking of wage payments, Mr. Coleman said that he was opposed to division of profits among the workers, but was in favor of stock ownership by employees. The hours of work must be determined by economic conditions, and the nature of the work performed, but in no case should be so long as to cause deterioration of the worker mentally or physically.

Fred R. Marvin, referring to radical propaganda being circulated in this country, said that an association having for its object the overthrow of the Government by a bloody revolution, confiscation and abolition of property rights, and abolition of the family relation, is in existence in this country today. This association is capably managed, and financed, and is directed by the Communist Internationale, of Moscow. Literature is being disseminated through 200 associations, and over 600 newspapers, of which 573 are printed in foreign languages. Mr. Marvin also referred to the political developments at Washington, and warned his hearers of the dangers in store unless the business men of the country take a deeper interest in the management of the affairs of the country.

Dr. Otto Geier, Cincinnati Milling Machine Co., spoke of the safety council formed in Cincinnati, and made a plea for its support both from the association and individual members. J. M. Manley also spoke, giving a résumé of the activities of the Cincinnati Branch during the year.

Texas Division, Southern Metal Trades Association Meets in Dallas

At the quarterly session of the Texas Division, Southern Metal Trades Association, held in Dallas, March 15, the establishment of the Dallas Vocational School, a project that has the backing of the Southern Metal Trades Association, was discussed. W. S. Mosher of Mosher Steel & Machinery Co., Dallas, acted as chairman.

C. A. Jay, heading the local vocational school, and until recently general manager of the Dallas Open Shop Association, said that close cooperation would improve conditions under which the foundrymen operated and immediately would create a better service for the people and for themselves. The open shop in Dallas had eliminated strikes and created a satisfactory labor condition. In Dallas in four years there has been constructed $82,000,000 worth of buildings, about $23,000,000 of this amount being erected in 1923, with peace and harmony. Nor have wages been reduced. In 1923, 1028 new industries were attracted to Dallas.

"The greatest curse to industry today," Mr. Jay said, "is a belligerent attitude of the employee toward the employer. Labor has a right to organize, but should be governed by sound principles."

Mr. Jay then explained some of the features of the Dallas Vocational School, which has the cooperation of the Southern Metal Trades Association. Others on the board of the new school which will serve six Southwestern States, with the possible addition later of Arizona, are W. D. Trotter, Briggs-Weaver Machinery Co., Dallas, and F. G. Pettibone, general manager of the Santa Fé. Dallas citizens have subscribed $500,000 for the trade school, one of the principal objects of which will be to instruct skilled mechanics for the metal and allied trades.

Ex-President W. C. Trout had sent a letter in which the foundrymen were urged to unite to support an effort to bring about reduction in railroad freight rates. Rates on pig iron were declared unreasonable and traffic managers were urged to cooperate to bring about a readjustment that will establish fair conditions. Following the reading of this letter, Joseph Behle gave an interesting talk on "Advantages of Machine Molding Over Hand Molding." W. H. Waterman discussed "Foundry Sands," declaring that these were becoming less available in Texas every year. Mr. Steele of Dallas spoke on "Patterns." J. M. Shaw of the Mosher Steel & Machinery Co., Dallas, spoke on "Foundry Flasks." Professor Fermier said the demand for skilled workers in the metal trades in Texas far exceeded the supply. Mr. Fermier invited the delegates to College Station for the June 15 session, and the invitation was accepted.

Meeting of Brass Manufacturers

The National Association of Brass Manufacturers held an interesting and well attended meeting at West Baden Springs Hotel, West Baden, Ind., March 12, 13 and 14.

The question of standardizing traps, of which the Department of Commerce, division of simplified practice, at Washington, through active cooperation with the trap manufacturers of various kinds, both cast and wrought, recommended a reduction of trap combinations to the number of 117, was referred to a special committee to cooperate with interested manufacturers and the Department of Commerce. The standardization committee recommended working toward the use of No. 27 thread as standard for all tubing. It is not the intention that this should be put in use at once, but the manufacturers should keep this in mind when such changes are brought about that they can adopt this standard. The commissioner was instructed to seek the cooperation of the manufacturers in conforming to the Briggs standard gage.

The catalog committee was continued. Members were advised in issuing new catalogs or literature in the future to use the piece instead of the dozen list as formerly.

The next meeting of the association will be held June 11 and 12, at Mount Clemens, Mich. The American Sanitary Mfg. Co., Abingdon, Ill., and the Vulcan Brass Mfg. Co., Cleveland, were elected to membership.

How Steel Men Helped Win the War

Robert S. Brookings Describes Attitude of Companies and Policy of Price Fixing Committee—Bills to Prevent Profiteering Considered

WASHINGTON, March 25.—Appearing as a witness before the House Committee on Military Affairs, approval in general only was given by Robert S. Brookings, formerly Chairman of the Price Fixing Committee of the War Industries Board, to bills introduced in Congress commonly known as efforts to prevent profiteering during war. He did not specifically state his attitude as to the feasibility of fixing prices. There are a number of such bills, and while the hearing was presumably on the one introduced by Representative John J. McSwain, of South Carolina, proposing the appointment of a commission to investigate the subject, other bills were discussed during the testimony of Mr. Brookings, which were also the subject of considerable discussion by William B. Colver, formerly member of the Federal Trade Commission, who cooperated with the Price Fixing Committee during the war. It was thought by Mr. Colver that the price-fixing system and the functioning of the excess-profits tax were a mistake and that the public had to bear, through the excess-profits in one form or another, much more than the Government itself got out of the surplus profits.

The committee has reported out a bill which is now on the calendar of the House and one section provides that during the war the President shall be authorized to "proclaim the property, commodities and services, Government control over which is, in his opinion, necessary . . . and the prices of such properties, etc." Still another bill, introduced by the American Legion, provides for the drafting of man power and conscription of material resources.

Costs of All Submitted

Mr. Brookings said that he had the cost sheets of every industry in the country during the war, including those of every one of the steel companies, from the least efficient to the United States Steel Corporation, which, he said, was the most efficient. He pointed out that the result of his own views as to what should be done in the way of stabilizing prices and getting production, and interfering as little as possible with the natural functions of business and trade, seemed to be different from Mr. Colver's opinions.

Mr. Brookings, who was warm in his praise of the cooperation of manufacturers, including those of the iron and steel industry, for voluntarily agreeing to prices, recited at some length the experiences of the Price Fixing Committee and to a large extent his testimony followed the lines of the pamphlet "Government Control of Prices," printed by the Government Printing Office in 1920.

When asked if he thought there would be any necessity for the appointment of a commission, Mr. Brookings said that the President can manufacture laws just as emergency may dictate and do anything he pleased, and asserted that if that is the spirit and intent of Congress, he thought it is all right, but, said Mr. Brookings, it is one thing to give authority of that kind to the President and it is another thing for the President to exercise it intelligently.

President's Unwritten Authority

He pointed out that in the late war there was no authority given to the Price Fixing Committee by Congress other than commandeering for war needs. It was declared that the President had the unwritten authority practically to do anything he pleased to win the war and that the Price Fixing Committee arbitrarily exercised an authority which it did not have by law, and threatened to commandeer concerns unless they abided by decisions as to prices for the civilian population, as well as prices for war needs. The industries would agree to almost anything, Mr. Brookings said, rather than to go into court to determine what a fair price for their property was. He declared that it would have been impossible for the committee to function if it had not been for the taking over of the entire Federal Trade Commission, with nearly 600 accountants, which Mr. Brookings said he grouped into various industries. He declared that the committee had one group on steel alone and it reported to him about every week. The accountants were taking off cost sheets all the while, it was asserted, and the committee met with representatives of that industry every 90 days and fixed the prices for the next period of 90 days.

The Excess Profits Tax

Mr. Brookings said that one of the things that the committee had to keep track of was how profits were running which he reported to the Ways and Means Committee, and the result was the excess profits tax, which, Mr. Brookings said, was a very considerable item in financing the war. He said that he believed the results of what was accomplished are shown by the fact that the committee had expressions from allied nations who wondered that without more legislation, the United States had been so successful in stabilizing values. Mr. Brookings told the committee that he thought it would get from experiences during the war a very intelligent key as to what, if anything, can be done today to make provision by duplicating what was done, with authority of law behind it, rather than the voluntary expression that the committee got from all of the industries. The witness said that to him it was a wonderful thing and declared that he could not recall an industry that raised an issue concerning it.

The Only Influence

Replying to questions which reflected a doubt as to the advantage of the system of price fixing used during the war, Mr. Brookings said that the only influence that had any effect on the Price Fixing Committee at all was the influence that the industry could bring to bear in arguments as to what sort of prices should be fixed so as to enable the committee to get what it wanted in the quantity desired. The prices were fixed at the lowest price at which the committee could get production, the witness said, and then it was the idea to take from the man who made the most money all that could be taken by way of the excess profits tax.

Those who were associated with President Wilson during the war never failed to have a great respect for "his almost uncanny intelligence when he faced any business problems," Mr. Brookings said, and he recited an interesting instance concerning the question of steel prices. He declared that President Wilson asked him to come over to the White House to see him about an important matter.

"I went to him," said Mr. Brookings, "and he said, 'It has been stated that it would probably facilitate our stabilizing of steel values and getting production, if we could take over the steel interests, as we have taken over the railroads.' I said, 'Mr. President, how much time have you for me to attempt to introduce you to the steel industry?' He said, 'Whatever time you need, sir.' I said, 'The steel industry is taking itself over; it will do anything in the world we want it to do. I have shown the Steel Corporation that their profits are running up very large, and I said, 'I want you to agree with us, after we have taken 80 per cent of these profits, or whatever the percentage is for tax purposes, you still have more left than I think you ought to have

for distribution in dividends, and I want you to agree, after taking your dividends, to turn the balance into the increased capacity for anything that the Government needs.'"

The witness was asked whether it was his thought that Congress ought to delegate power to the President as Commander-in-Chief of the Army and Navy. He replied that he did not care how much power was given to the President. It is his idea, Mr. Brookings said, that where there is a law undertaking to deal with the problem of commandeering an industry, it should be broadened to a point where it can properly deal with the problem and take care of the civilian population.

Speeding up Profiteering

Acting Chairman McKenzie, turning to the question of so-called profiteering, declared vigorously that "if there is anything in God Almighty's world that we can do that would speed up profiteering to a greater extent than it was indulged in in the last war, I cannot imagine what it would be. I do not think we could make matters any worse."

Mr. Brookings did not accept this frank view and took occasion in combating it to speak of cooperation received from the steel industry.

In this connection he said: "Well, I sometimes think public opinion as to profiteering is a very progressive thing. One man starts, and he finds some one thing wrong, some one thing where apparently there has been an undue profit, and it is a popular thing, you know, to accuse everybody of profiteering during the war. There is no industry that met us more frankly and fully than the steel industry. I told you that President Wilson sent for me because someone had suggested it, and thought that steel was so important that we ought to take over the steel industry as we took over the railroads. I know something about railroading; I have been in almost everything in my life; and I know about industry, and taking over the railroads would have been child's play as compared with taking over the steel industry. And the attitude of the steel industry was from the beginning; 'Now tell us, what do you want us to do?' I want you to produce all the steel you can, and I want to fix the price, and where you have acquired the highest efficiency in your business, as you have, Judge Gary, and have paid large profits, I want to take what I can in the way of excess profits, and then I want you to do with the balance whatever I say.

Answer of the Steel Makers

"Their answer was, 'All right.' I said, 'We are going to let you make $500,000,000 this year, and we are going to take about $250,000,000 excess profits to help run the war, and the other $250,000,000 we want you to give the stockholders so much, and the balance we want you to put into increased production. We are short of ship plates. We know if you put in fifteen or twenty million dollars in that activity it is going to probably be dead on your hands, but we want you to do it.'

"And they acquiesced; that was their attitude. A great many of the steel industries had not been making much money, and during the war, of course, they made money; it was the natural consequence of the war. When they made it, then, measured in pre-war values, it did not amount to much. Everybody does not stop to think that $100,000 after the war did not mean any more than $50,000 before the war in purchasing power, which, after all, is the true value of money. It was not such a frightfully big thing as the people think."

Mr. Brookings told the committee frankly that he did not think that the Government would want to arbitrarily fix the price of a man's product and then have to go into court and pay two or three times as much as had been given him. He said that as a merchant he liked to avoid litigation and suggested that it likewise would be a good thing for the Government to avoid litigation by agreement with the industrial interests of the country.

"I do not see any way in the world of machinery getting rid of gray matter, after all," declared Mr. Brookings.

Corrugated Culvert 28 Years in Service

A corrugated, ungalvanized iron culvert, one of the first ever installed in this country, was exhibited at

the recent Chicago Good Roads Show by the Armco Culvert and Flume Manufacturers Association to illustrate the long life of iron when exposed to destructive elements.

The culvert was taken from a highway near Crawfordsville, Ind., where it had been underground for 28 years. It was originally installed by James H. Watson, who is credited with being the inventor of the corrugated culvert, and it was washed out and replaced three times. When the culvert was removed a tree with a 24-in. trunk that had grown at the outlet since installation served to illustrate the service it had given and after all these years it was still in good condition.

The culvert was made of black iron, and is sandwich like in structure with layers of common steel between layers of practically pure iron. This was known as "puddled top and bottom."

Dr. Plimmon H. Dudley, steel rail expert of the New York Central Railroad, whose death was announced in THE IRON AGE of Feb. 28, left the bulk of his fortune to establish a professorship at Yale University, "which shall be devoted to research and instruction in connection with the history and development of the science of railroad service." The bequest is intended to promote that branch of research work to which Mr. Dudley devoted much of his life and "in particular the work in connection with the development and improvement of designs of rails, roadbeds and crossties."

Officials of the General Electric Co., West Lynn, Mass., plant have formulated a plan to encourage employees to become property owners. Financial assistance will be extended by the corporation in instances where it is required and detailed information and statistics will be prepared to assist workers in selecting homes in desirable locations, locations of schools, transportation, and building costs being included in the efforts of an advisory committee. The idea is the outcome of a suggestion made several years ago by the late Richard H. Rice, manager.

Prosperous Year of U. S. Steel Corporation

Large Increase in Production and Earnings—Tonnage Exceeded in Only Two Previous Years—Heavier Payroll and Larger Number of Employees

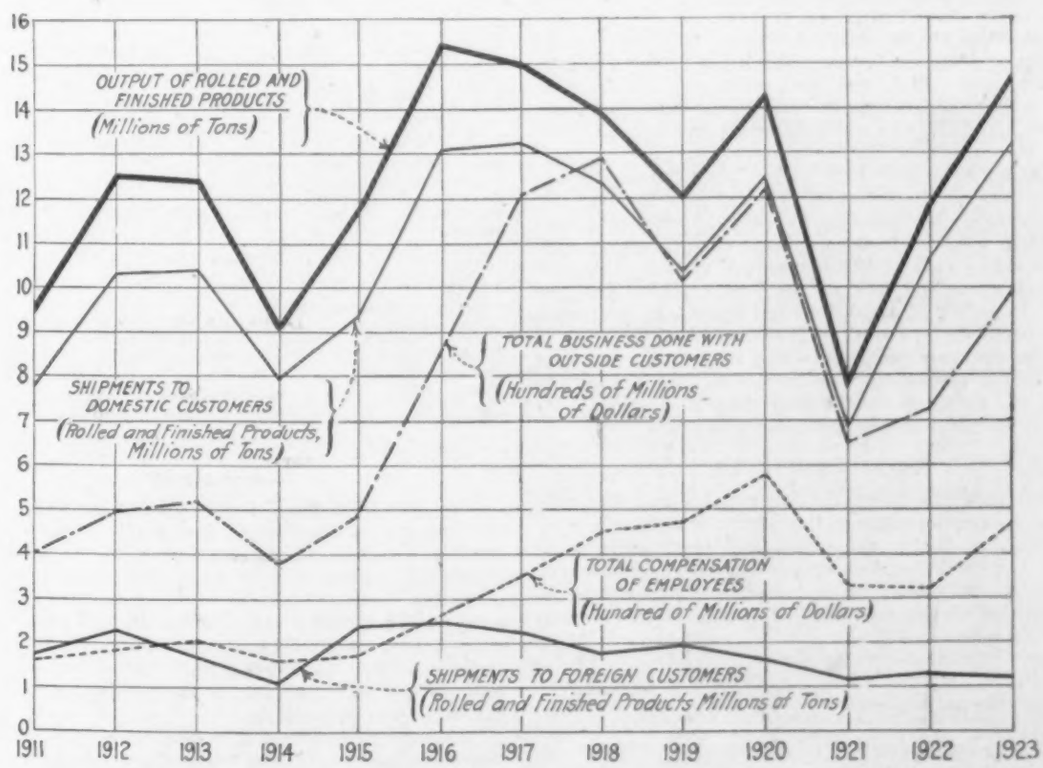
THE twenty-second annual report of the United States Steel Corporation is for the year ended Dec. 31, 1923, and it shows a very decided improvement in production and earnings as compared with the moderate improvement shown in the report for 1922. The increase in the production of ore was 42.4 per cent, in coal 51.5 per cent, in coke 42.3 per cent, in pig iron 39.1 per cent, in ingots 26.4 per cent, and in rolled and finished steel products for sale 24.9 per cent.

A notable feature of the year was the large increase in payments to employees, due to increase of numbers and to the introduction of shorter hours to take the place of the 12-hr. turn. On the subject of employees and wages the report says:

The Change to Shorter Hours

"On April 6, 1923, an increase was made of about 11 per cent in the wage rate paid employees of the subsidiary manufacturing and iron ore mining companies. A further increase in the total outlay for labor was occasioned by the subsidiary companies revising the conditions of employment at the several mills and departments looking toward the total elimination of the 12-hr. turn or day. This revision followed a conference called by and correspondence conducted between the late President Harding and the representatives of the iron and steel industry of the country. After a most painstaking investigation it was concluded that the change would be feasible when and as an increased supply of labor would be available and selling prices were at a level which would permit absorption of the increased expense which it was recognized by all would necessarily result. Prior to the midsummer of 1923 there was a marked shortage in the labor supply required to fully serve the mills on the plan under which they were then operating. But it appearing about July 1 that this condition would very likely improve materially, it was decided to inaugurate the revision on Aug. 16.

"The revised plan adopted established the hours for employees connected with continuous processes on an 8-hr. per day basis, and all other employees on a 10-hr. day. The wage rates of employees whose working day was reduced from 12 to 8 hours were so adjusted as to afford earnings equivalent to an increase of 25 per cent in the hourly and base rates previously paid, and the wage rates of all employees reduced to or continued on a 10-hr. per day basis were advanced 10 per cent to equalize unbalanced conditions in rates brought about by the adjustments in the wage scale for employees reduced from 12 to 8 hr. Rapid progress was made in effecting the change. By Dec. 1, in all the subsidiary companies except one, the 12-hr. turn had been, broadly speaking, totally eliminated. In the remaining subsidiary company the change was not, owing to shortage, particularly in skilled labor, completely effected until in February, 1924. The number of additional employees required by those companies in which the plan had become effective and on basis of operating conditions then prevailing, was 17,117, an increase of over 10 per cent. Of the increase in total payroll resulting from this change approximately 60 per cent



Thirteen Years' Course of Five Significant Features in the History of the United States Steel Corporation's Business

arises from employment of additional men, and 40 per cent from increased wage allowances to employees whose hours of service were not changed, being those who already were working 10 hr. or less per day."

The total number of employees in the service of the corporation and the subsidiary companies during the entire year, the total payroll and average wages paid, in comparison with similar data for the preceding year, were as follows:

	1923	1922	Increase Number	Increase Per Cent
Average number of employees during entire year	260,786	214,931	45,855	21.3
Largest number in any one month	277,779 (Oct.)	235,360 (Nov.)	42,419	...
Smallest number in any one month	240,586 (Feb.)	186,542 (Feb.)	54,044	...
Total pay roll for year	$469,502,634	$322,678,130	$146,824,504	45.5
Average salary or wage per employee per day	$5.83	$4.91	$0.92	18.7

Employees and Payrolls

The average number of employees in the service of all companies during the year, and the total salaries and wages paid in comparison with corresponding results for the preceding year, were as follows:

Employees of	1923 Number	1922 Number
Manufacturing properties	180,727	150,847
Coal and coke properties	33,354	26,856
Iron ore properties	15,311	11,906
Transportation properties	27,135	21,523
Miscellaneous properties	4,259	3,799
Total	260,786	214,931
Total salaries and wages paid	$469,502,634	$322,678,130
Average Earnings per Employee per Day for Year:		
All employees, exclusive of general administrative and selling force	$5.73	$4.78
Total employees, including general administrative and selling force	5.83	4.91

Judge Gary's Comments

In his general remarks, Judge Gary says:

"The improvement in the demand for iron and steel products which developed in the early fall of 1922, after nearly two years of depression in the industry, continued in very satisfactory volume until June, 1923, following which there was for several months a decided diminution in the amount of new business offered. In the closing months of the year, however, there was a noticeable improvement in tonnage entered and this has continued to the date of writing this report. At the close of 1923, the tonnage of unfilled orders for various classes of rolled steel products was 4,445,339, compared with 6,745,703 tons at close of the preceding year. At Feb. 29, 1924, the unfilled orders equaled 4,912,901 tons.

"Entering the year 1923 with a large tonnage of unfilled orders on the books, which was increased by liberal buying during the first five months, the subsidiary companies were enabled to operate on an average during the entire year at 88.3 per cent of capacity, the output during the first half of the year reaching 92.6 per cent. In point of total tonnage output of materials produced for sale, the year 1923 has been exceeded in only two previous years, 1916 and 1917. As a result of these larger operations, together with improved selling prices, the earnings for the year show a substantial increase over those of the preceding two years."

Capital Expenditures

The expenditures by the corporation and the subsidiary companies during the year for acquisition of additional property, extensions and improvements to plants and facilities, less credits for property disposed of and for net stripping and development expense at mines, equaled the sum of $60,762,920, classified generally as follows:

Manufacturing properties	$35,416,609
Coal properties	8,079,269
Ore properties	5,313,516
Railroads and lake docks	9,670,447
Great Lakes and ocean steamers	1,458,338
Limestone, gas and water properties, land companies, etc.	1,939,929
	$61,878,108
Less, credit for cost of mine stripping and development expense absorbed in operations in excess of expenditures during year for that purpose	$1,115,188
Net expenditures	$60,762,920

The prices received in 1923 for the 13,196,298 tons of rolled and other steel products shipped to the domestic trade netted an average of $8.87 more per ton than the average price received per ton in 1922 on an equivalent tonnage of similar products shipped; and in respect of the 1,177,524 tons of export shipments, the 1923 prices received netted $10.03 more per ton than the average price obtained in preceding year.

Volume of Business

The total value of business transacted by all companies during the year, as represented by their combined gross sales and earnings, equaled the sum of $1,571,414,483, as compared with a total of $1,092,697,772 in the preceding year.

This amount represents the gross value of the commercial transactions conducted by the several subsidiary companies, and includes sales made between the subsidiary companies and the gross receipts of the transportation companies for services rendered both to subsidiary companies and to the public.

The earnings for the year resulting from the above gross business represent the combined profits accruing to the several corporate interests on the respective sales and services rendered, each of which is in itself a complete commercial transaction.

Inventories

	Dec. 31, 1923	Dec. 31, 1922
Ores—iron, manganese and zinc	$73,907,919	$76,275,064
Limestone, fluxes and refractories	5,255,856	5,091,428
Coal, coke and other fuel	16,414,130	10,807,030
Pig iron, scrap, ferromanganese and spiegeleisen	23,934,176	12,374,219
Pig tin, lead, spelter, copper, nickel, aluminum and dross and skimmings	10,632,742	8,288,802
Rolls, molds, stools, annealing boxes, etc.	12,759,194	11,591,006
Ingots—steel	2,112,229	2,533,616
Blooms, billets, slabs, sheet and tin plate bars, etc.	25,934,058	16,283,993
Wire rods	1,492,927	1,499,913
Skelp	2,355,456	1,588,148
Finished products	58,872,408	47,619,421
Manufacturing supplies, stores and sundry items not otherwise classified	38,934,139	35,578,946
Mining supplies and stores (for ore and coal properties)	7,909,361	7,256,390
Railroad supplies and stores	7,045,570	6,210,753
Merchandise of supply companies	2,072,477	1,818,297
Material, labor and expense locked up in uncompleted bridge, structural and other contract work	$38,124,530	
Less bills rendered on account	33,209,122	
	4,915,408	5,540,986
Stocks abroad and on consignment	21,975,028	12,940,727
Material in transit	5,454,932	6,868,594
Total	$321,978,010	$270,167,333
Less, inventory reserve	51,220,055	49,460,082
Balance	$270,757,955	$220,707,251

Miscellaneous

Pensions. Pensions were paid during the year by the trustees of the United States Steel and Carnegie Pension Fund to retired employees to the amount of $1,448,113, compared with $1,266,661 disbursed in the preceding year. Pensions were granted during the year to 576 retiring employees. At the close of the year there were 4054 names on the pension rolls, a net increase of 168 during the year. Since the inauguration of the plan in 1911 an aggregate of $9,543,235 has been paid in pensions.

Accident Prevention. The total amount expended by the corporation and the subsidiary companies during 1923 for accident prevention and safety work was $1,763,417, compared with an outlay of $1,175,171 in the preceding year. The materially increased operating activity of the plants in 1923, compared with 1922, together with the abandonment of the 12-hr. per day

Production for Two Years

Products	1923	1922	1923 Increase	
Ores Mined	Tons	Tons	Tons	Per Cent
In the Lake Superior region (iron ore)				
Mesabi and Vermilion ranges	24,658,317	16,549,588	8,108,729	49.0
Gogebic, Menominee and Marquette ranges	3,005,181	2,477,672	527,509	21.3
In the Southern region—Alabama (iron ore)	3,239,370	2,545,242	694,128	27.3
In Brazil, S. A. (manganese ore)	112,241	205,677	93,436*	45.4*
Total	31,015,109	21,778,179	9,236,930	42.4
Limestone quarried	6,571,486	5,633,186	938,300	16.7
Coal mined				
For use in the manufacture of coke	28,234,030	16,778,413	11,455,617	68.3
For steam, gas and all other purposes	7,055,871	6,515,058	540,813	8.3
Total	35,289,901	23,293,471	11,996,430	51.5
Coke manufactured				
In bee-hive ovens	7,142,901	3,431,846	3,711,055	108.1
In by-product ovens	11,694,730	9,805,212	1,889,518	19.3
Total	18,837,631	13,237,058	5,600,573	42.3
Blast furnace production				
Pig iron	16,527,830	11,885,179	4,642,651	39.1
Spiegel, ferromanganese and ferrosilicon	201,396	141,984	59,412	41.8
Total	16,729,226	12,027,163	4,702,063	39.1
Steel ingot production				
Bessemer ingots	5,451,390	4,068,578	1,382,812	34.0
Open-hearth ingots	14,878,560	12,013,807	2,864,753	23.8
Total	20,329,950	16,082,385	4,247,565	26.4
Rolled and other finished steel products for sale				
Steel rails (heavy and light tee and girder)	1,649,906	1,225,999	423,907	34.6
Blooms, billets, slabs, sheet and tinplate bars	715,244	673,099	42,145	6.3
Plates	1,783,846	1,410,414	373,432	26.5
Heavy structural shapes	1,204,395	936,733	267,662	28.6
Merchant bars, hoops, skelp, light shapes, etc	3,007,662	2,456,915	550,747	22.4
Tubing and pipe	1,563,982	1,178,611	385,371	32.7
Wire rods	213,518	158,495	55,023	34.7
Wire and wire products	1,636,580	1,404,663	231,917	16.5
Sheets (black and galvanized) and tinplates	1,774,467	1,504,121	270,346	18.0
Finished structural work	458,595	301,248	157,347	52.2
Angle splice bars and all other rail joints	288,118	218,538	69,580	31.8
Spikes, bolts, nuts and rivets	84,456	72,531	11,925	16.4
Axles	154,876	96,403	58,473	60.7
Steel car wheels	104,271	78,247	26,024	33.3
Sundry steel and iron products	81,553	69,314	12,239	17.7
Total	14,721,469	11,785,331	2,936,138	24.9
Miscellaneous products				
Zinc	64,205	59,818	4,387	7.3
Sulphate of iron	36,079	32,389	3,690	11.4
Fertilizer—"duplex basic phosphate"	15,748	16,513	765*	4.6*
Fertilizer—Sulphate of Ammonia	150,000	123,118	26,882	21.8
Ammonia (as liquor)	2,528	3,816	1,288*	33.8*
Benzol products	143,312	119,373	23,939	20.1
	Bbls.	Bbls.	Bbls.	
Universal Portland cement	14,440,000	13,168,000	1,272,000	9.7

*Decrease.

turn, necessitated the employment of a large number of additional men, many of whom were comparatively inexperienced with steel mill operations and not fully educated in accident prevention measures. These conditions precluded a further reduction in 1923 in the ratio of accidents per 100 employees compared with previous year's result. Compared with the year 1906, however, when accident prevention work was systematically inaugurated, the total number of disabling accidents in 1923 per 100 employees was 55.4 per cent less than in the first named year.

Accident Relief. The disbursements made by the subsidiary companies during the year for work accidents (including accruals not yet actually payable under State compensation laws) was $4,843,172, compared with an outlay of $4,170,945 in 1922. Of the total disbursed in 1923, 90 per cent was paid or is payable directly to the injured employees or their families.

Sanitation. The expenditures made during 1923, in providing modern sanitary facilities throughout the plants, mines and departments, for the health and comfort of the employees, totaled $3,019,363, compared with an outlay of $2,252,975 in the previous year. At the close of the year there were in and about the plants and works 2118 comfort stations with adequate toilet facilities, including 24,434 washing faucets and basins, 5722 showers, 161,096 lockers and 4437 sanitary drinking fountains.

Housing and Welfare. At the close of 1923 the subsidiary companies had advanced or loaned employees

Foreign and Domestic Shipments

The shipments of all classes of products in comparison with shipments during the preceding year were as follows:

Domestic shipments	1923 Tons	1922 Tons	Increase or Decrease Tons	Per Cent
Rolled steel and other finished products	13,196,298	10,708,022	2,488,276	23.24 Inc.
Pig iron, ingots, ferromanganese and scrap	308,475	273,963	34,512	12.60 Inc.
Iron ore, coal and coke	405,875	740,380	334,505	45.18 Dec.
Sundry materials and by-products	108,965	109,082	117	.11 Dec.
Total tons all kinds of materials, except cement	14,019,613	11,831,447	2,188,166	18.49 Inc.
Universal Portland cement (bbl.)	14,329,295	13,548,544	780,751	5.76 Inc.
Export shipments				
Rolled steel and other finished products	1,177,524	1,203,882	26,358	2.19 Dec.
Pig iron, ferromanganese and scrap	2,691	3,377	686	20.31 Dec.
Sundry materials and by-products	106,049	90,894	15,155	16.67 Inc.
Total tons all kinds of materials	1,286,264	1,298,153	11,889	.92 Dec.
Aggregate tonnage of rolled steel and other finished product shipped to both domestic and export trade	14,373,822	11,911,904	2,461,918	20.67 Inc.

TOTAL VALUE OF BUSINESS (Covering all of above shipments, including cement, completed cars and steamships delivered and other business not measured by the ton unit)	1923	1922	Increase Amount	Per Cent
Domestic (not including inter-company sales)	$905,744,282	$646,592,293	$259,151,989	40.08
Export	87,171,880	75,311,489	11,860,391	15.75
Total	$992,916,162	$721,903,782	$271,012,380	37.54

Comparative Income Account for the Fiscal Years Ended Dec. 31, 1923 and 1922

	1923	1922	+Increase —Decrease
Earnings—before charging interest on bonds and mortgages of subsidiary companies:			
First quarter	$36,874,674.77	$21,303,631.59	+$15,571,043.18
Second quarter	49,940,029.97	29,330,255.01	+ 20,609,774.96
Third quarter	49,112,517.68	29,596,455.29	+ 19,516,062.39
Fourth quarter	52,026,445.43	29,558,574.43	+ 22,467,871.00
Total for year	*$187,953,667.85	*$109,788,916.32	+$78,164,751.53
Less, interest on outstanding bonds and mortgages of the subsidiary companies	$8,306,993.48	$8,259,605.93	+ $47,387.55
Balance of earnings	$179,646,674.37	$101,529,310.39	+$78,117,363.98
Less, charges and allowances for depletion and depreciation applied as follows, viz.:			
To depreciation and replacement reserves and sinking funds on bonds of subsidiary companies	$41,745,434.23	$33,382,624.09	+ $8,362,810.14
To sinking funds on U. S. Steel Corporation bonds	9,724,720.38	9,305,884.70	+ 418,835.68
Net income in the year	$128,176,519.76	$58,840,801.60	+$69,335,718.16
Deduct:			
Interest on U. S. Steel Corporation bonds outstanding	$18,764,567.62	$19,232,304.87	— $467,737.25
Premium on bonds redeemed and acquired for Sinking Fund, viz.:			
On subsidiary companies' bonds	165,611.86	150,205.98	+ 15,405.88
On U. S. Steel Corporation bonds	774,464.84	724,873.04	+ 49,591.80
Balance	$108,471,875.44	$38,733,417.71	+$69,738,457.73
Add: Net balance of sundry receipts and charges, including adjustments of various accounts	$235,188.82	$920,037.52	— 684,848.70
	$108,707,064.26	$39,653,455.23	+$69,053,609.03
Dividends on U. S. Steel Corporation stocks, viz.:			
Preferred, 7 per cent	$25,219,677.00	$25,219,677.00	.....
Common { 1923, regular 5 per cent, extra ¾ per cent / 1922, regular 5 per cent }	29,227,393.75	25,415,125.00	+ $3,812,268.75
Surplus net income	$54,259,993.51	†$10,981,346.77	+$65,241,340.28
Less, sums appropriated and expended or to be expended account of additions, improvements or betterments to plants and property	$40,000,000.00	.....	+$40,000,000.00
Balance carried forward to undivided surplus	$14,259,993.51	†$10,981,346.77	+$25,241,340.28

*Balance of earnings after making allowances for estimated amount of Federal income taxes.
†Deficit provided from undivided surplus.

the net sum of $7,975,091 on contracts or mortgages, carrying interest at 5 per cent, and payable in installments over a period of years, to assist them in acquiring homes under the corporation's home-owning plan. The activities of the subsidiary companies in conducting work and efforts for the general welfare of employees and their families, to which references have been made in previous reports, have been consistently continued.

Increased Earnings of Sloss-Sheffield Steel & Iron Co.

President J. W. McQueen of the Sloss-Sheffield Steel & Iron Co. stated in his remarks to the stockholders, made in conjunction with the yearly report, that production showed substantial gains last year, pig iron increasing 47 per cent, coke 49, coal 47 and ore 52 per cent over the previous year. He characterized the year in pig iron throughout the country as one of intensive production in the first half and noteworthy for freedom from labor troubles and for improvement in railroad transportation.

Net income for the year totaled $2,491,020, after deductions were made for interest, depreciation and Federal taxes from a total operating profit of $3,773,875. This compares with net income of $578,894 in 1922, and amounts to $20.22 per share on common stock, after allowing for preferred dividends. Operating profit in 1922 was $1,394,109. Charges for depreciation and depletion last year were $721,628, against $498,641 in the preceding year.

The balance sheet as of Dec. 31 showed cash of $833,019 and accounts receivable of $1,306,407. Inventories were carried at $2,155,619. Listed among the liabilities were accounts payable of only $773,819. The company had no bank indebtedness, having wiped out all of the $2,631,000 shown in the report a year ago.

"Notwithstanding the favorable showing indicated by both the earnings of the company and the increase in production," Mr. McQueen said, "it cannot be fairly said that all conditions were favorable throughout the entire year. There was a halt in buying in early summer, and as a consequence, three furnaces were put out of blast in August and September. However, with additional buying in December and January, prices advanced and the company now has a comfortable tonnage on the books for delivery over the first half of the year at prices that should yield a fair profit.

"For many years, the bulk of the southern foundry iron has been marketed north of the Ohio River. This condition has been changing until now a larger proportion of the company's tonnage is sold in southern territory."

February Refractories Report Favorable

February report of the Refractories Manufacturers Association makes a favorable showing as compared with that for the month before. Production, shipments and sales of clay fire brick rolled up substantial gains last month as compared with January and there was a good gain in silica brick shipments and production, though a slight loss in new business. The heavy operating rate of the iron and steel industry is in no small measure responsible for the betterment. Capacity reporting was virtually the same for both months.

Figures in 9-in. equivalents for the two months, figures in parentheses being the percentages to economical monthly producing capacity of those reporting, follow:

Clay Fire Brick

	February	January
Capacity reporting	54,657,300	54,387,300
Stock first of month	138,883,589(253)	135,598,014(248)
Production	41,358,879(75)	38,966,272(71)
Shipments	40,026,883(73)	37,420,170(68)
*Stock end of month	140,215,585(255)	137,144,116(251)
New orders	47,778,422(87)	46,118,987(84)
Cancellations	787,080(1)	421,848(1)
Net new business	46,991,348(86)	45,697,139(84)
Unfilled orders	55,320,501(101)	48,292,475(88)

*Actual free stock end of February 54,514,520; end of January 53,457,207.

Silica Brick

Capacity reporting	9,759,667	9,759,667
Stock first of month	15,118,353(154)	15,830,979(161)
Production	6,203,189(63)	4,789,559(49)
Shipments	6,521,783(67)	5,501,185(56)
*Stock end of month	14,799,759(151)	15,118,353(154)
New orders	8,046,696(82)	9,375,729(96)
Cancellations	10,456(0)	507,239(5)
Net new business	8,036,238(82)	8,868,390(90)
Unfilled orders	11,881,647(121)	10,367,192(106)

*Actual free stock 7,305,221 at end of February and 7,149,086 at end of January.

Industrial Germany Changing Its Form

Growth of Trusts and Industrial Crisis Weaken German Syndicates—Control of Prices No Longer Possible—Stahlbund to Be Dissolved

BERLIN, GERMANY, Feb. 29.—German industrial organization has lately taken a turn of interest not only in regard to domestic developments but which also will influence international commercial intercourse with this country. This change has taken place gradually since the war and is, in some of the principal industries, mainly within the result of the struggle between the old syndicates and cartels and the new rising power, the great concerns. The most difficult time for the cartels has, however, started with the change in the market since the stabilization of the currency. Being the loosest of these combinations, the cartels are confining their activity to the fixing of prices or sales conditions. The syndicates control the entire production and sales, and deal directly with the trade and the consumers as representatives of the entire industry in the place of the individual member. Being organizations on so-called horizontal lines, i. e., including manufacturers in the same industry only, their greatest enemies are the trusts and among these especially the vertical combines, whose development has made such rapid strides in Germany during the last few years.

There are three large groups of cartels, those regulating prices, cartels controlling production, and the territorial cartels. The distributing organizations, the large syndicates, represent the latest phase in this development. They had attained special importance in the Rhenish-Westphalian coal industry, in the iron and steel industry, in the potash industry and in several others. The cartels, confining their activity to the fixing of general conditions of sales, have made special progress in the industries manufacturing staple goods with little differences in quality, and some branches in the chemical industry, in the stone, the paper, the metal and engineering industry are espjecially strongly organized along these lines. A large number of organizations in the wholesale trade, the Verbände or conventions, may also be classed under the cartels. They number more than 300 but only those have acquired influence which confine their activities to the working out of general sales conditions. All attempts to enlarge their sphere of influence were doomed to failure, as they were unable to control their members sufficiently.

Attacks on the Cartels

During the last few years the cartels have been attacked from without and from within. The outside opponents were the consumers, whose interests are safeguarded by the Government. The cooperative societies, which had gained considerable influence both economically and politically during the revolution, have also been strongly opposed to the cartels and syndicates. The disintegration of the latter is, however, principally due to the trend of industrial development, which is closely bound up with the formation of the great trusts. Not only the horizontal combines but also the vertical trusts are gradually forcing the syndicates to make their conditions more lenient, in order to have greater freedom in the market. Few cartels and syndicates have been able to withstand the attacks and even the best organized of them are maintained only under great difficulties. The general scarcity of ready capital, and especially the keen competition which has set in since the stabilization of currency, have strengthened the forces opposed to the cartels and syndicates, and made it impossible for them in almost all industries to retain control.

In the industries in which large concerns combine the greatest part of the production, the cartels and syndicates have already become of secondary importance. In fixing their prices they have to take the works with the lowest efficiency as a standard, and the well equipped firms naturally make huge extra profits, which enable them in many cases to buy up the financially weaker members. The first principal development of the cartels falls in the few years before 1900. Several hundreds have been established, but a large number had to be dissolved.

During the war especially they were gaining in importance, as the Government made great use of these organizations to regulate supplies for the army and the population. It stepped in when the textile cartels were demanding rigorous terms from their customers, and it decreed the establishment of syndicates in different lines, of which those in the Rhenish-Westphalian coal industry, in the steel and in the potash industry are notable examples, and generally made increases in prices subject to Government consent. Many cartels which under normal conditions would have disappeared came to a new life under the influence of Government patronage. On the other hand, official supervision interfered considerably with the individual freedom of these organizations, and the strength of the Government supervision of the industry has at times formed one of the main points in the arguments for the nationalization of industries in this country, especially in the coal and potash industry.

Steel Works and Mines

In the coal industry, for instance, the continuance of the Rhenish-Westphalian Syndicate was often endangered, as it seemed impossible to combine the greatly differing interests between the mines directly connected with the great iron and steel works and the mines which were independent. The combines between iron works and mines have become the most powerful in these industries and most of the trouble in the respective syndicates and cartels is due to these combinations refusing to be hampered by restrictions of the trade organizations. The steel works, linked up with mines, being in a stronger position than those having to buy their fuel in the open market, are naturally opposed to the coal syndicate allotting the fuel to the various works, and also to the iron and steel syndicates, as soon as orders became scarce, and they want to take advantage of their favorable competitive position.

In 1914 differences in the Coal Syndicate came to a climax and negotiations were suspended but, under the pressure of the syndicate law which was enacted in June, 1915, a new syndicate had to be formed until March, 1917, with the inclusion of the fiscal mines, which held a very strong position in it. It was eventually extended until April, 1922, and has been prolonged several times since then. Its present term of agreement runs until October.

Coal and potash syndicates and several others are self-governing bodies for the respective industries, on which all the parties connected with it are represented. They are under the supervision of the Ministry for Economic Affairs. The coal and potash syndicates are continued by Government order and their principal governing bodies, the Reichskohlenrat (Federal Coal Council) and the Reichskalirat (Federal Potash Council), have been invested with special powers for dealing with the entire industry.

Iron and Steel Syndicates

The syndicates in the iron and steel industry have also undergone considerable changes. The agreement between the iron and steel works and the Stahlwerksverband (the sales syndicate of the industry) came to an end in June, 1920, and the latter ceased to dispose of

the entire production of the works. The Stahlwerksverband is a joint stock company and deals now only with general questions of the industry in regard to freight, quality, etc. The other organization in the industry, the Deutsche Stahlbund (Association of the Steel Industry) is to be definitely dissolved now and its general functions are to be transferred to the Stahlwerksverband.

The functions of the Eisenwirtschaftsbund, a body which has been fixing compulsory prices and conditions in the iron and steel industry, on which the producers (Stahlbund), the consumers, and representatives of the general public and of the employees have been represented, came to an end when the consumers withdrew from it in December last. As it has lost all importance, it is being dissolved now. Negotiations with a view to forming a new syndicate in the tube industry have been started, but there seems little possibility of bringing about an agreement among the diverse interests. The new Stinnes tube works near Bochum, which are to start production shortly, would probably be a too-powerful outsider for the syndicate.

The importance of the cartels is greatly diminishing and the deciding factor in the recent developments in German industrial organization is the growth of the large concerns. This development is generally only in its first stages and the cartels are swept aside by it. The very basis of industrial organization has changed since 1914 and, as the interests of the members of the cartels are at variance, there are few industries in which they will be of any importance in future. The stronger the concerns grow, the more their interest in the cartels weakens. This has been apparent during all the negotiations for the renewal of cartel agreements that have recently taken place, and some could be extended only by giving great individual freedom to their members. It is significant that a number of cartels connive at underselling by members and even in the Rhenish-Westphalian Coal Syndicate, the model of all similar organizations, sales below the stipulated prices have taken place lately.

Stabilizing Influences

The cartels and syndicates have, however, been an important factor even in the recent industrial development of this country. During the time of the inflation of the German currency they performed a valuable service in keeping prices at a uniform level in the industry, and the selling too cheaply abroad during the beginning of the mark depreciation, which resulted in heavy losses to this country, was eventually checked mainly by the cartels. The export control offices established for the same purpose may also be regarded as export cartels. They are also abolished now.

Eventually the cartels and syndicates have, however, in many cases taken an unfair advantage of their position and kept inland prices at such a height, and advanced them without regard to the general situation of the country, that they have been accused of helping to enlarge the inflation of the mark and increase the difficulties of the Government to cope with the situation. The traders who were represented on the boards of the syndicates often did not oppose the price policy, as they were able to charge their customers correspondingly, and the representatives of the employees consented in many cases, as a necessary increase in remuneration was made dependent upon a higher price.

Governmental Supervision

Under these conditions the Government decree of Nov. 2, 1923, which was made possible through the Ermächtigungsgesetz (emergency law), giving the Government special powers, has met general approval. It is significant that the representatives of the consumers, especially the cooperative societies, and of the large concerns (Stinnes for instance) were unanimous in demanding that the power of the cartels and syndicates should be severely restricted. The former were in favor of such measures, as the introduction of free competition would mean lower prices, and the latter, as it would give them freedom to use their competitive strength for all it was worth. The decree established a cartel court and stipulated that the cartel agreements have to be made in writing, and that those which exclude appealing to the cartel court, or which have been made on word of honor, are void.

In case an agreement is found to endanger the industry or the general welfare, the Minister of Economic Affairs may appeal to the cartel court to declare it void, he may decree that every member withdraw, or that the agreement may not come into force until he has received a copy of it. The industry or the general welfare is regarded as being endangered when production or sales are unduly restricted, if the prices are advanced or, in cases where payment is being demanded in non-depreciating currency, surcharges are asked for risks, or when economic freedom is disproportionately restricted through an embargo on purchases or sales, or by differences being made in prices or conditions.

Any member of the syndicate may withdraw from it for any of the above reasons and, in case of differences arising, the cartel court (a chairman and four members), gives a decision on application. The chairman is nominated by the organizations in trade, industry, banking and transport, by the president of the Federal Economic Court. Differences are, however, as far as possible removed by direct negotiations between the parties, without appealing to the courts, and a special board of arbitration has been established at the Federal Association of German Industry to deal with such cases in the first instance. The Minister for Economic Affairs also generally refers cases submitted to him to the arbitration of the interested industry. Public discussions of the prices and conditions have also recently made the cartels more cautious.

The innate conservative tendency to retard technical progress in manufacture, through the exclusion of competition, makes the cartels and syndicates unsuited to take any great part in future struggles for markets and it seems that they will eventually be retained only in industries where a large number of small manufacturers need the help of a central body. Their weakening will not make German industries a less formidable competitor in world markets. A large number of financially weaker firms and those that have, under the era of the cartels, neglected to make improvements will probably drop out, but those remaining will naturally include the financially strongest and most up to date.

February Sheet Sales Behind Shipments

Sheet sales by independent manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers fell rather heavily in February, as compared with the previous month, the decrease being 45,777 tons. As compared with the last month of last year, the loss of new business was really steep, amounting to 160,365 tons. For December and January, sales ran ahead of shipments, but last month the shipments exceeded sales by almost 60,000 tons. The figures in net tons for February in comparison with those of the previous month and February last year follow:

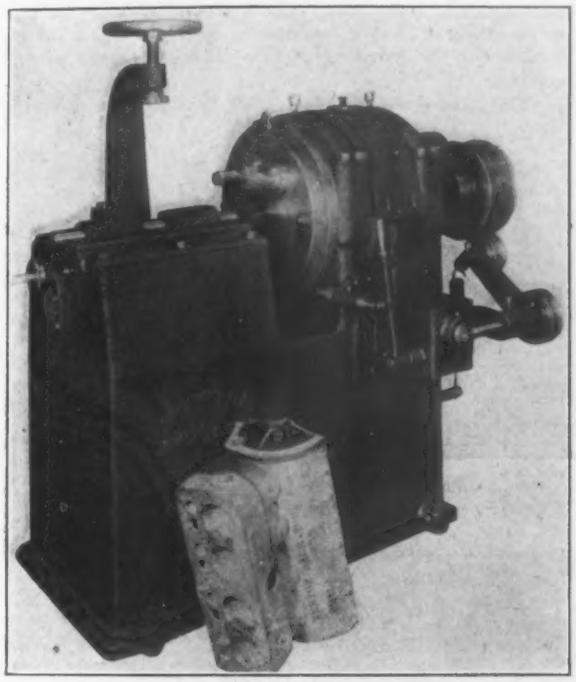
	1924		1923
	February	January	February
Capacity	392,000	427,000	381,000
Per cent reporting	72.7	73.5	70.1
Sales	189,081	234,858	253,197
Production	275,118	274,097	237,919
Shipments	249,859	228,660	217,808
Unfilled tonnage	434,145	471,053	547,897
Unshipped stocks	82,362	79,528	119,237
Unsold stocks	30,658	37,541	29,123

Service and repair shops for General Electric apparatus are in operation at the following points: Atlanta, Chicago, Los Angeles, New York, Kansas City, Minneapolis, Oakland, Philadelphia, St. Louis and Seattle. The shops are expected to furnish men on short notice in case of accidents or for emergency work.

The Toledo factory of the Combustion Utilities Corporation, under the supervision of Paul Nutting, has been perfecting the general line of burners and small combustion apparatus acquired through the consolidation with the Improved Appliance Co. in 1923.

Automobile Crankcase Ends Milled on Production Basis

High production is claimed for the planetary type radius milling machine illustrated, which has been developed for milling the ends of automobile crankcases. It is stated by the makers, the Newton Machine Tool Works of the Consolidated Machine Tool Corporation, Twenty-third and Vine Streets, Philadelphia, that crankcases of the type illustrated, which are cast integral with the cylinders, are machined at the rate of 250 pieces per 8-hr. day.



Planetary Type Radius Milling Machine. The ends of crankcases of the type shown are milled at the rate of 250 pieces per 8-hr. day

The machine is equipped with two spindles, as shown, one for the roughing and the other for the finishing cutter, which are driven by spur gears, meshing with a pinion on the driving shaft. Both spindles are adjustable radially and the roughing spindle has horizontal adjustment to compensate for the wear on the cutters.

The spindles are mounted in a drum, which is driven by a worm and worm wheel and rotates at the rate of 0.58 r.p.m., this giving, on a 9½-in. diameter milling circle, a feed of 17.4 in. per min. Driving gears are of steel and bronze, with the exception of the worm wheel on drum, which is of cast iron. Gears are fully inclosed to run in oil. The drum is fitted with a hardened steel dog which automatically trips the feed after the cutters have completed one cycle, and when the jig has been reloaded, the feed is then engaged manually by means of the lever shown at the front of the machine.

The fixture for holding the work is fitted with taper gibs and is adjustable horizontally by means of a screw which is fitted with a micrometer dial. The work is located by a bar fitting into the crankshaft bearings and rests upon hardened steel plates and a locating pin. It is clamped by means of a screw clamp fitted with a large hand wheel.

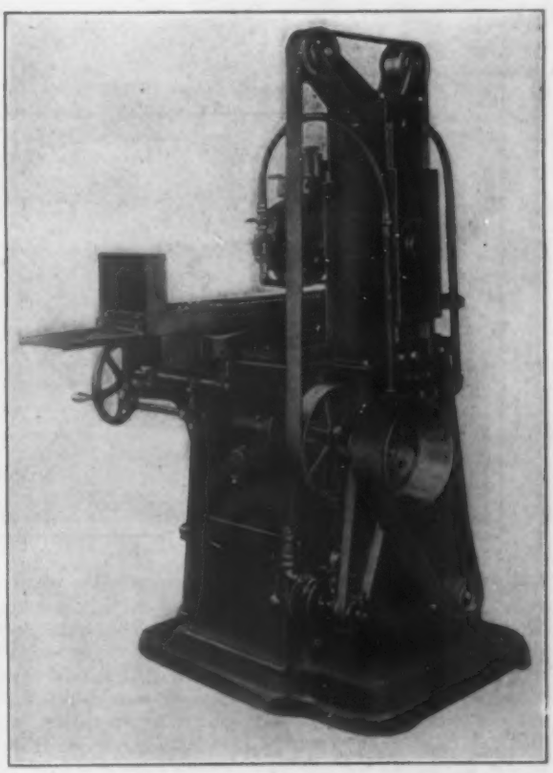
Effect of Annealing on Galvanized Coatings

In compliance with a request received a short time ago the Bureau of Standards has been investigating the relative merits of galvanized materials which have undergone a special annealing treatment as compared with those which have passed through the ordinary galvanizing process. This is of interest because galvanized materials which have been subjected to such annealing treatments are now being marketed under special trade names and some rather unusual claims are being made for them. The investigation will be concerned mainly with the effect of low temperature annealing upon the ductility of the zinc coatings of wire (as shown by the bend test) and the resistance of such annealed coatings to chemical reagents such as copper sulphate which is a much used commercial test for galvanized wire. A study will also be made of the structural changes in the coating resulting from the annealing.

Improves Surface Grinder

The No. 78 automatic surface grinder of the Wilmarth & Morman Co., Grand Rapids, Mich., is now available with the driving motor mounted within the base of the machine, an arrangement emphasized as protecting the motor from grit, dust and water and reducing the floor space required for the machine. Because exposed belts can be more easily guarded, the new arrangement is considered better also from the safety standpoint. Ball bearings are now used and a motor of 2 hp. is said to be ample.

Another improvement incorporated is the control of the longitudinal table travel. Formerly when changing from hand to automatic feed it was necessary to disengage a pin located in the center of the hand wheel, in addition to operating the hand lever which threw the table in or out of either feed. This pin has been



Automatic Surface Grinder with Driving Motor Inclosed Within the Base and Improved Control of Table Travel

eliminated, and only one movement of the hand lever is now required to throw the table directly from hand feed into automatic feed. The control wheel in front of the table remains stationary and does not swing, as in the usual arrangement. To reverse the operation, the hand lever is moved in the opposite direction. The table is then engaged ready for hand feed, the same movement automatically disengaging the power feed.

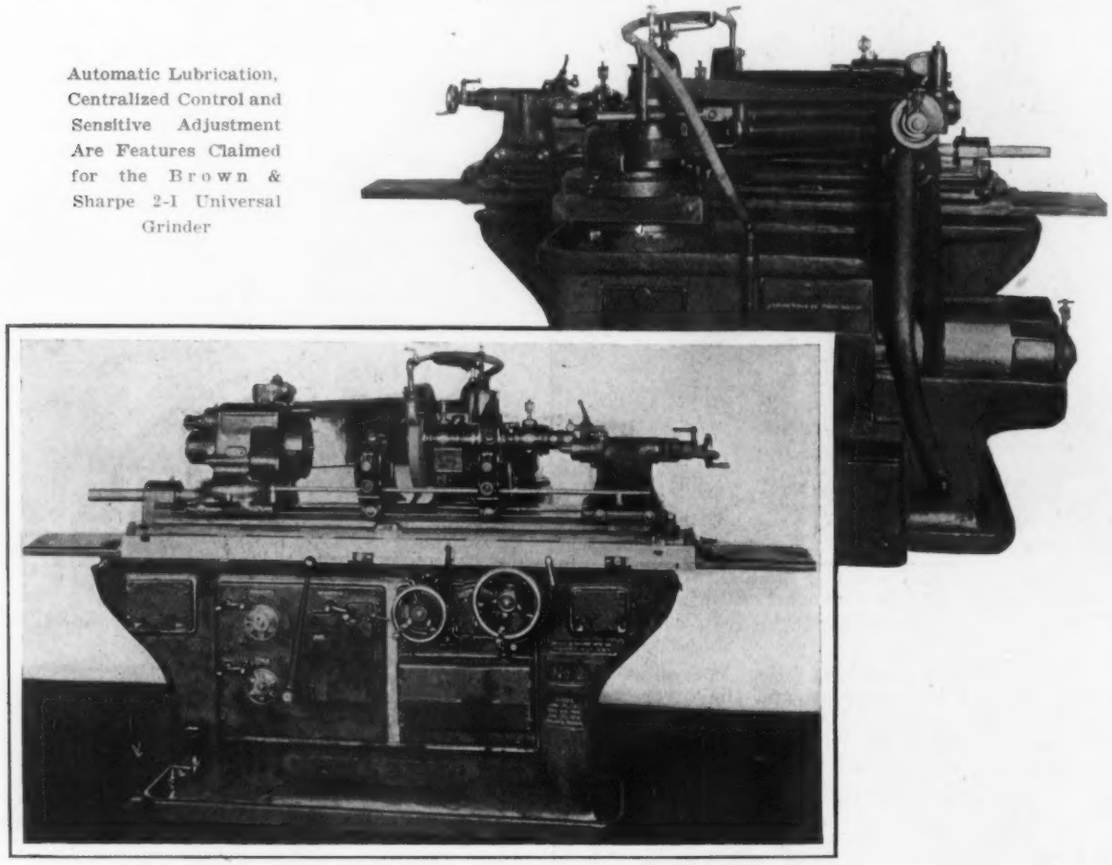
A patented clutch, which is of a ball-bearing type, is also a feature. With the new clutch it is claimed that vibration and shock have been eliminated when the table reverses at each end of the stroke. Arranged for motor drive, the machine weighs 2200 lb.

NEW UNIVERSAL GRINDER

Constant Speed Drive, Automatic Lubrication and Centralized Control Are Features

A new universal grinding machine designated as the No. 2-I, and equipped with constant-speed self-contained style of drive, centralized control, automatic lubrication and other features intended to provide maximum capacity has been added to the line of the Brown & Sharpe Mfg. Co., Providence.

The machine is shown in the accompanying illustrations. It takes work 14 in. in diameter by 36 in. in length, and swings 12½ in. in diameter over the water guards. The independent automatic cross feed, quick traverse of the wheel-slide and all-geared speed and feed change mechanisms of the company's line of plain grinding machines are employed also in this machine. The table and work is controlled by the hand lever shown slightly to the left of the center in the front view illustration, this lever also actuating a brake for stopping the table and the work. The arrangement of the various controls is intended to permit of operation from one position. The machine is adaptable to individual motor drive, the motor being fastened to the floor and connected by belt to the driving pulley.



Automatic Lubrication, Centralized Control and Sensitive Adjustment Are Features Claimed for the Brown & Sharpe 2-I Universal Grinder

The drive is through an 8½-in. pulley which has a face to accommodate a 4½-in. belt. The driving shaft runs on ball bearings at a constant speed of 900 r.p.m. Mounted also on the main drive shaft at the rear of the machine is the grinding wheel driving pulley or drum, the face of which is wide to permit the travel of a belt in compensating for the varying position of the wheel slide. The arrangement of the wheel drive may be noted from the rear view illustration. The horizontal idlers are mounted in roller bearings and carried in a swinging frame, the vertical idlers being mounted on the wheel stand as shown. The swinging frame is intended to provide automatically the proper belt tension, adjustment being also provided to compensate for belt stretch. The various wheel speeds are obtained by split pulleys of different diameters.

Automatic lubrication of all operating mechanism is a feature, oil being pumped from a tank in the base directly to the various units and returned by gravity to the base. The oil supply is shut off automatically when the table actuating mechanism ceases operation. Sight feed oilers and grease cups are provided for bearings that are not automatically lubricated.

The wheel spindle is of alloy steel. It runs in bearings that are hardened, ground and lapped, with self-alining bronze boxes provided with means for compensating wear. The abrasive wheel is of 14 in. maximum diameter and from ¾ to 1½ in. thick. The wheel slide swivels, and the angle of the setting is indicated by graduations on the base. The platen also can be swung to an angle of 10 deg. maximum, which is a feature intended for the grinding of two different tapers at one setting.

The hand cross feed and quick traverse are operated from the front of the machine by a handwheel which has two positions; one engaging the hand cross feed and the other disengaging the hand cross feed and engaging the quick traverse. The automatic cross feed has a range of 0.00025 to 0.004 in. at each reversal of the table and it may be set to throw the feed automatically out of operation as soon as the work has been ground to the diameter required. The wheel is fed to the work while the table is stationary by means of the independent automatic cross feed, a safety lock preventing traverse of the table and preventing also engagement of the longitudinal feed.

The table travel is automatic. The table ways have large bearing surfaces on which oil is distributed as the table reciprocates by rolls turning in oil wells. Metal covers protect the ways from dust and dirt. The table turns on a central pivot bracket and may be set at any angle with the ways, this adjustment being indicated by a scale reading to 8 deg., 3½ in. taper per ft. and 30 per cent. Clamps are provided at each end to secure it.

The speed of wheel and work and the feed of the table are independent. Four changes of wheel speed, from 1500 to 2400 r.p.m. are provided; 12 indicated changes of work speed, from 24 to 492 r.p.m.; and 12 indicated changes of table feed that can be divided into

two series, 6 to 24 in. per min. and 33 to 128 in. per min. These speed and feed changes are made by two rotating levers at the front of the machine, a dial beside each lever indicating the speed or feed in operation. A lever back of the table hand wheel is provided for stopping the table in travel if desired. The table hand wheel is disconnected automatically when the power feed is engaged. The reverse mechanism is sufficiently sensitive, it is claimed, to permit work to be ground close to a shoulder.

The headstock work drive plate is driven from the main driving shaft at the rear of the machine, through the clutch and speed cases to the transposing gears at the front. The transposing gears, which provide the fast and slow series of speeds, transmit the power to a splined sleeve contained within a bevel gear. The latter meshes with another bevel gear mounted on a shaft within the central pivot of the swivel table. Power is transmitted through bevel gears to a shaft mounted within the swivel table and then through two spur gears at the end of the table, one of the spur gears being mounted on the telescoping base shaft of the headstock. The drive is then taken through a series of bevel gears to a short shaft within the headstock. The final drive to the work driving plate is by means of silent chain.

The arrangement of the head stock and foot stock is similar to that in the company's No. 2 universal grinder. The machine weighs 6950 lb. and requires floor space of 42⅝ in. x 142 in.

Meeting of Indianapolis Branch, National Metal Trades Association

INDIANAPOLIS, March 22.—More than 400 manufacturers and representatives of the manufacturing concerns in Indianapolis and from different parts of the State attended the eighteenth annual meeting of the Indianapolis branch of the National Metal Trades Association, held at the Claypool Hotel, March 21. Fred R. Marvin, associate editor of the New York *Commercial*, was the principal speaker at the meeting.

W. W. Coleman of Milwaukee, Wis., president of the National Metal Trades Association and L. W. Fisher, national secretary of the organization, also spoke at the meeting. Warren D. Oakes of the Oakes Mfg. Co., Indianapolis, president of the Indianapolis branch of the association, presided. Mr. Oakes was re-elected president in the referendum election, the results of which were announced at the meeting. W. D. Hammerstadt was elected vice-president and L. M. Wainwright treasurer. Members of the executive committee to serve two years were elected as follows: Alfred W. Thompson, U. G. Leedy and O. B. Iles. Members of the eleventh district committee elected are: R. P. Johnson, Muncie, chairman; D. O. Skillen, Muncie; D. E. Ross, Lafayette; John T. Wilkin, Connersville, and W. Hathaway Simmons, Indianapolis.

Must Consider Tungsten Company Claim

WASHINGTON, March 25.—Secretary of the Interior Hubert Work has been directed by Justice Frederick L. Siddon in Circuit Court here, to take jurisdiction of and consider the claim of the Pacific Tungsten Co., Lovelock, Nev., for relief under the War Minerals act. The claim was made that the Department of the Interior had failed to allow this concern the amount claimed for losses and expenditures in an effort to produce tungsten during the war. The department allowed $12,590 as compared with $387,981, the amount asked. The court ordered a writ of mandamus to issue making it necessary for the Secretary of the Interior to consider further facts in the proceedings.

Electric Furnace Refractories

The round table discussion on "Refractories for Electric Furnaces" promises to be one of the most important features of the Philadelphia meeting of the American Electrochemical Society, April 24, 25 and 26. The introductory talk will be made by Dr. Alfred Stansfield of McGill University, Montreal. The discussion proper will be from the viewpoint of the furnace operator, the furnace builder and the refractory manufacturers. M. L. Hartman, Carborundum Co., Niagara Falls, N. Y., is chairman of the round table discussion. He has already been in touch with a large number of well known men in the electric furnace field and many plan to attend and enter into the discussion. The steel and non-ferrous furnaces will be fully discussed.

Decided Difference of Opinion as to Preferential Ocean Rates

WASHINGTON, March 25.—Certification from the Shipping Board to the Interstate Commerce Commission to establish preferential railroad rates on exports and imports moving in American vessels has aroused widespread discussion. Designed as an aid to the upbuilding of the American Merchant Marine, this effort, running true to history, has been attacked by foreign shipping circles and has been made the subject of foreign propaganda, and the usual cry of retaliation has been raised. This phase of the matter has not disturbed the Shipping Board in the least, but the fact remains that there are important American exporting interests which sincerely are anxious for the establishment of an American Merchant Marine, yet are apparently doubtful of the merit of fixing preferential rates for their products, provided they move in ships carrying the American flag.

This proposal involves the suspension of what is known as Section 28 of the Merchant Marine Act of 1920, and the protest made by American shipping interests, among them being flour and oil exporters, is based on the fear that there will not be adequate American vessels to serve them, although the Shipping Board insists there will be. It is specifically provided by the law that this section can be made effective only in the event that there is sufficient American shipping space.

The point seems to be one involving a difference of opinion among authorities whose desire for the establishment of an American Merchant Marine cannot be questioned.

Dictionary of Specifications

The chairmen of the three committees of the representative board organized to act in an advisory capacity to the Department of Commerce in publishing the dictionary of handbook specifications, met at the Bureau of Standards, Feb. 18, to discuss interrelated problems and to formulate plans for their solution with full knowledge of the nature and progress of the work which the Bureau has been carrying on.

Committee No. 1 on classification is now giving consideration to the proposal of its chairman that the decimal system of classification be recommended for use.

Committee No. 2 on form and size has under consideration the proposal of its chairman that the loose-leaf form in standard catalog size be recommended.

The chairman of committee No. 3 on scope has proposed for consideration the recommendation that a system having great flexibility be adopted as a means for selecting material for the handbook. This would admit the publication of annotations relating to certain existing specifications that are readily available as well as the direct publication of certain other specifications, the supply of which is very limited. The matters which are now being discussed by the three committees will be presented for the consideration of the advisory board at its next meeting to be held about two weeks hence.

Cleaning Iron Castings Hydraulically

Success Reported from Experiments at Erie Foundry of General Electric Co.—Saving in Annual Cost Placed at Double the Cost of Installation

A NEW method of cleaning castings, successfully experimented with at the Erie, Pa., foundry of the General Electric Co., was described by Carl B. Lockhart of that plant in a talk before the members of the Pittsburgh Foundrymen's Association at the regular monthly dinner and meeting at the General Forbes Hotel, Pittsburgh, March 17. He reported not only a considerable saving in labor, but also of time, since the method briefly is that employed in hydraulic mining and a casting which would require a day's time of two men to clean by hand, has been done, the speaker stated, in 30 to 45 minutes. Dust, that makes cleaning room work so unattractive to the workmen, is eliminated and apparently the possibilities of the method have only been scratched, since application at Erie has been largely on large castings only. Mr. Lockhart said:

"The idea of washing cores from castings has been tried at various times and places during the past 10 or 15 years, but never with any great success, possibly on account of the difficulties encountered, such as the disposal of the excess water and mud, the handling of the sand, the naturally sloppy character of the work and also, possibly, because in a great many places there was not enough of the work that the cores could be washed from to make it worth while to carry on extensive experiments and make careful study of the problems.

"Our foundry is 375 ft. wide and 700 ft. long, divided into five parallel bays. The two main molding bays, where the large work is done, are 75 ft. wide. The three other bays are devoted to small casting work, core rooms, ovens, cleaning room, shipping room and raw material storage. There are several concrete lined molding pits, four of them being 72 ft. long, 16 ft. wide and 10 ft. deep. These pits are constructed with slots in the walls every four feet, so that they can be partitioned off to suit the size of the particular job. There are also three circular concrete pits, one of them being 24 ft. in diameter and 12 ft. deep. As many as 38 pit jobs can be run at one time.

"Our work is practically all large, thin-section work, requiring a large amount of core work. We do not pour any really heavy jobs; about the heaviest is 60 tons, but the size is limited by what we can ship. Most of our large work goes to Schenectady for use in the manufacture of large turbines and generators. We work up into cores and facing, for this large work, about 25,000 tons of sand and gravel a year, a large portion of this, of course, being old sand. It was the digging out of this amount of baked cores that led to experimentation with the washing process.

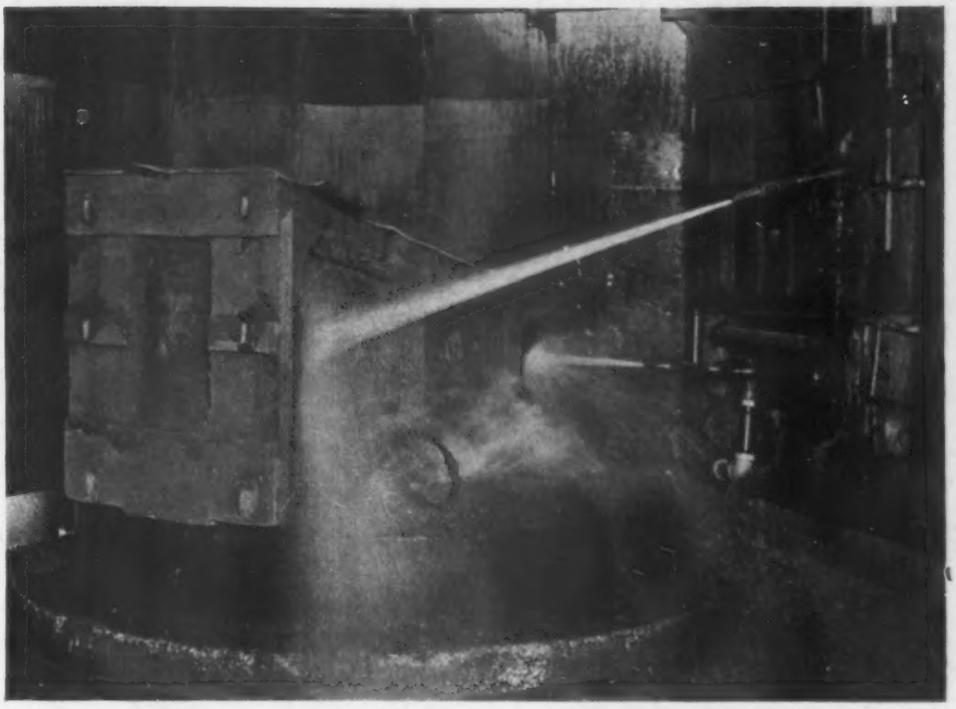
"During the summer of 1920 the first experimental work was done. The casting to be cleaned was set out in the flask yard and the operator, fitted out with rubber boots, raincoat and hat, directed a stream of water on the casting, using the ordinary 2½-in. fire hose and nozzle, the water pressure being about 100 lb. per sq. in. The results obtained were up to expectations and satisfactory enough to warrant further development. It was decided to use higher pressure on the water and to dispose of the excess water by screening out the coke and settling the sand, letting the overflow run into the plant sewer.

"Early in 1921 a room was built in the foundry, having a cemented floor and walls constructed of heavy galvanized sheet steel supported on wooden framework. The floor area is 16 x 24 ft. and the walls 12 ft. high. There are two large swinging doors in one end of the room, which open to the full width, so that large castings can be easily placed in the room by an overhead crane. At first this room was covered with a removable roof to prevent the spray from flying all around the foundry, but it was found that there was comparatively little spray which got outside the room and, as the placing and moving of this roof was considerable trouble, its use was finally discontinued.

Heavy Water Pressure Used

"To increase the water pressure a Worthington single-stage centrifugal pump, direct connected to a

Large Casting for Generator After Having Core Sand Washed Out By Hydraulic Means, Leaving Core Rods to Be Removed



Washing Out Core Sand From Castings By Means of Heavy Hydraulic Pressure From Two Monitors. The casting is mounted on a turntable. Both turntable and nozzles are under control of the operator, who uses a heavy glass window for observation of the progress of the work. Waste material is washed into the sewer, but the sand is recovered by allowing it to settle in a sump

50-hp. motor, was installed. This pump boosts the water pressure from 100 lb. to 250 lb. and delivers about 256 gal. per min. It was necessary to dig a sump and to connect it to the sewer system, to dispose of the excess water. This done, some experimental work was carried on to determine the size and kind of nozzle to be used. A Monitor turret type nozzle, with ¾-in. tip, similar to those used on the decks of fire tugs, was adopted, mounted on a 3-in. standpipe, the piping from the pump to the nozzle being 3 in.

"The operator stands just outside the room and heavy plate glass windows in the walls just above the nozzles permit him to look into the room to watch the progress of the work. A small ½-in. pipe with holes drilled in it is installed just above these windows, so that the operator can wash them off from time to time as they become covered with dirt during the washing operation.

"When it was necessary to turn the casting around, this was done during the first year with a crane, but this proved so awkward and costly that a turntable was installed. The table in use is 8 ft. in diameter. Control is located in the operator's room and he can turn the casting around while washing is in process. It runs on a ball race and is constructed with rack and pinion drive, with the 50-hp. motor and the driving gears located just outside the room.

"It is surprising to see the action of the water on the large cores. The principles involved are, of course, the same as in hydraulic mining. The force of the water actually breaks down the core and the volume of water washes it away, leaving behind the rods and arbors. It does the work thoroughly and rapidly. A casting which would require two men all day to remove the cores can be easily washed in 30 to 45 minutes.

Advantages Obtained

"After having operated this washing process for the past three years we are more than pleased with the results obtained. There are several advantages to the process, which may be summed up under the following headings:

Direct saving in labor.
Recovery of sand, gravel and coke.
Recovery of core rods and arbors unbent and unbroken.
Removal of wastes by water without handling.
Elimination of dust in the cleaning room.

"The first two advantages mentioned we can show in money value. The cost of the installation complete was $4,600. The cost of the water is 5c. per 1000 gal., and the cost of power is 1c. per kwhr. Only two men are required in the operation of the room; one is paid 55c. per hr. and the other 42c. per hr. During 1923, we figure the net saving from this process to have been $10,800, and we were unable to wash all of the castings. It is found also that the core rods and arbors are recovered unbent and unbroken, and this, of course, is quite an item, although we are unable to place the money value on the saving.

"All of the waste material is washed down the sewer and the cost of handling is thus eliminated. The sand, gravel and coke which remain behind are used over again. No difficulty whatever has been experienced, nor has the sewer system become clogged through the sludging of this material into it. That is not surprising, since only the fines and slimes reach the sewer and the volume of water is sufficient to keep them in suspension until they pass out into the lake. This washing process has eliminated all of the dust usually seen in a cleaning room where large castings are cleaned and makes it a desirable place in which to work.

Planning to Expand the System

"The company now is designing a second room in which it will be possible to wash the sand and gravel out, instead of taking it out with a grab bucket, the present practice. The sand and gravel coming from the two rooms will go through a washing plant, together with all the refuse sand from the foundry, and will make possible the recovery of all the metal contents, including the rods, fins, etc., as well as the sand and gravel, which will be returned for use in making core and facing sand. In brief, the plan will accomplish three important things: Recovery of contents from foundry refuse sand; recovery of sand and gravel, and the washing away of the wastes that are of no value, and thus save the cost of hauling to a dump.

"In consideration of the savings represented in labor and recovery of waste material, the process has warranted all of the efforts and money expended in its development and we feel that there is an additional field in the washing of smaller castings and in general the adoption of the wet process for the recovery of values in foundry wastes."

Discussion

In the discussion on the paper it was brought out that, when the company used the ordinary method of

cleaning, 12 men were employed in the cleaning room. The results outlined by the speaker were obtained on iron castings alone, but it could be used as successfully on steel castings. All castings had to be cool before cleaning, to avoid danger of cracking. The process was not tried on the cleaning of cores from cylinders. It was emphasized by Mr. Lockhart that the process was not to be confused with the so-called "soaking" process and that the cores actually were broken down by the force of the water pressure.

Bookings of Steel Castings in February

WASHINGTON, March 24.—The Department of Commerce announces February bookings of steel castings, based on reports from principal manufacturers by companies representing over two-thirds of the commercial castings capacity of the United States amounted to 70,829 tons, as against 49,046 tons in January. The following table shows the bookings of commercial steel castings for the past 14 months by 65 identical companies, with a monthly capacity of 96,900 tons of which 38,300 tons are usually devoted to railway specialties and 58,600 tons to miscellaneous castings:

	Total		Railway Specialties		Miscellaneous Castings	
Month 1923	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity
January ..	100,605	103.8	47,879	125.0	52,726	90.0
February .	90,152	93.0	39,845	104.0	50,307	85.8
March	143,564	148.2	76,409	199.5	67,155	114.6
April	90,968	93.9	39,610	103.4	51,358	87.6
May	89,493	92.4	38,788	101.3	50,705	86.5
June	84,878	87.6	42,773	111.7	42,105	71.9
July*	52,066	53.7	16,741	43.7	35,325	60.3
August ...	**50,463	52.1	18,332	47.9	**32,131	54.8
September.	**47,476	49.0	21,685	56.6	**25,791	44.0
October ..	**37,312	38.5	9,840	25.7	**27,472	46.9
November .	**39,572	40.8	12,916	33.7	**26,656	45.5
December .	**41,014	42.3	15,182	39.6	**25,832	44.1
1924						
January ..	**49,046	50.6	18,970	49.5	**30,076	51.3
February .	70,829	73.1	34,901	91.1	35,928	61.3

*Two companies with a capacity of 785 tons per month on miscellaneous castings now out of business.
**Revised.

Thomas Sheet Steel Co.'s Plans

The Thomas Sheet Steel Co., Niles, Ohio, announces that six of the company's 12 mills were placed in operation this week. The company has developed plans for the electrification of the plant and modernization of the mills. Six of the mills in the present complement will be modernized and electric drives installed, while the other six mills will remain in operation. They will then be suspended for improvement when work on the original six units is completed.

The Thomas plant is one of the oldest in the Mahoning Valley, and has been idle for 18 months. It was part of the original property of the Brier Hill Steel Co., but had been operated independently prior to the formation of the Brier Hill company. When that interest was absorbed by the Youngstown Sheet & Tube Co. ownership again changed hands.

The placing of life insurance for 65 employees has been announced by Thomas McDonald, president Carlisle Foundry Company, Carlisle, Pa. With the exception of the executives and office personnel the employees are insured for $500 each, this amount to increase at the rate of $100 for each additional year of service.

A portable electric drill, recently placed on the market by the General Electric Co., has a special series wound motor built so that the torque varies inversely with the speed, thus to make stalling the machine practically impossible. Gears on the drill are made of heat-treated alloy steel and run in grease.

The International Harvester Co., in an answer filed with the Federal Trade Commission, has denied charges of entering into a combination and conspiracy with retail dealers in agricultural implements to fix and maintain prices.

More Than 20,000 Employees Subscribe for Bethlehem Steel Stock

More than 20,000 employees of the Bethlehem Steel Corporation applied for a total of over 51,000 shares of its 7 per cent cumulative preferred stock in response to the initial offering under its recently announced employees' saving and stock ownership plan, which closed on March 15.

The employees applying represented approximately one-third of the entire number of employees and the applications averaged 2.7 shares each. The number of shares applied for is about 10 per cent of the total shares of the 7 per cent preferred stock outstanding.

Although the applications substantially exceed the estimates made when the offering was announced, the trustees under the plan have decided to accept all applications in full. The applications will be filled from stock already authorized and issued.

The number of stockholders of the corporation in January of this year was 49,497. The addition of 20,000 employee-stockholders will increase by two-fifths the total number of stockholders of the corporation.

Eugene G. Grace, president Bethlehem Steel Corporation, commenting on the results of the first offering, stated that the corporation is well pleased with the way the employees have responded to the offer, and contemplates an annual offering through trustees of a limited amount of stock, which may be paid for by the employees through small deductions from earnings.

Automobile Production in February

For twelve successive months the production of passenger cars and trucks, combined, as reported by the Department of Commerce, has exceeded 300,000 each month. The figures for February include 336,363 cars and 31,072 trucks, or a total of 367,435 vehicles. With the exception of April, May and June of last year, this is the largest month's output in the history of the industry. It represents a larger number of cars than exist today in any country of the world outside the United States, Canada, Great Britain and, possibly, France. It exceeds by 90,000 the number of cars produced in February of last year, while January exceeded January of last year by more than 70,000 vehicles.

Production for the year 1923 of the 186 manufacturers reporting to the Department of Commerce was 3,636,772 passenger cars and 376,129 trucks, making a total of 4,012,901 vehicles. For the 12 months ended Feb. 29, the total was considerably higher than this, the number of passenger cars having been 3,781,845 and the number of trucks 394,166, or a total of 4,176,011 vehicles. Counting 310 working days, this represents more than 13,100 cars per day.

Bauxite in 1923

The production of bauxite in the United States in 1923 was 522,690 gross tons, an increase of over 72 per cent in quantity as compared with the domestic production in 1922, according to a statement prepared by James M. Hill of the Geological Survey.

Bauxite Produced and Consumed in the United States, 1922-1923, Gross Tons

Year	Domestic Production	Imports	Exports*	Apparent Consumption
1922.....	309,600	23,656	19,617	313,639
1923.....	522,690	119,020	78,560	563,150

*Largely bauxite concentrates.

Domestic Bauxite Consumed by Industries, 1922-1923, Gross Tons

Year	Aluminum	Chemicals	Abrasives and Refractories	Total
1922.....	211,550	78,550	19,500	309,600
1923.....	380,518	68,872	73,300	522,690

Reducing the cost of doing business will be the major subject of the convention of the Society of Industrial Engineers, to be held at the Hotel Statler, Buffalo, April 30 to May 2. Papers and discussion will be presented on administration, production, personnel and other departments of business. Plant inspection trips will be made as heretofore.

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A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

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Business Forecasts Differ

BUSINESS forecasts are of great interest and importance. That is plain from the large number of bureaus and services that are supported for making them, not to speak of the highly appreciated circulars and letters of bankers and brokers. The utilization of these advices expresses itself, quite naturally, to a large extent in the stock market.

There are times when the doctors agree; other times when they disagree. In the latter case their clients are bound to be bewildered. That state of mind exists more or less at present, when some of the services are optimistic, others not so much as they were, while others still are definitely pessimistic or bearish. Why should there be such striking differences of opinion?

The disagreement is comprehensible if we recognize that the unbalancing of economic conditions during the war, and the years immediately following, still prevails. There is no country of the world, not excepting the United States, wherein economic conditions are in the normal pre-war equilibrium or anything like it. The future welfare of Europe is hanging in the balance right at this moment.

Quite apart from the impoverishment of many countries by the war, a condition not quickly to be made good, there occurred a change in the economic behavior of all the people, to which we have referred heretofore. Indeed, there began to be an economic unbalancing, with a display of extravagance in living, at the very time when nations were fighting for their lives and needed every ounce of their resources. In no country were these conditions more clear than in Great Britain.

Under such conditions millions of people came into the enjoyment of luxuries that previously had been unknown to them; and they found them good. Having made that discovery, they are not going to surrender them willingly.

Some economists hold that the present elevation in the scale of living of the American people, or what is alleged to be that, is ascribable to the unbalancing of the previous division of the national income, and moreover to the consumption of principal itself. The former, it is urged, finds expression in failure to provide new plant to an adequate extent and the latter in the deterioration of plant we already have. Even if such a hypothesis be correct, no considerations of that sort will deter the people from spending and enjoying themselves. Profligacy is checked only by inability.

Be all that as it may, what determines business in the last analysis is the extent to which workers are working. The major part of them will always be working to supply the needs of immediate consumption. A relatively small part may be engaged in producing new capital goods. Some may be diverted to the doing of things that are relatively useless. Such a diversion would work against real national prosperity, but there would be great activity just the same. The only things that would reduce activity would be the slowing up of the workers themselves or a temporary unbalancing in industry, necessitating pauses for the digestion of surplus stocks.

Reading some of these signs in the present times, we can understand why signals should be flying in contrary ways and why there is disagreement among the doctors and questioning among their clients. There is gloom in some of the old-time industries that are concerned with the homely things. The position of the fertilizer companies is the most depressing. On the other hand, there is activity in the automobile manufacturing industry and everything associated with it. These are the antitheses. Intermediate industries show a gradation of colors, like the spectrum, according to whether they are the more associated with the production of capital goods or consumers' goods. With the unbalanced condition that exists it is irrational to expect that all industries are going to move alike.

If there be hesitation among the bright industries it is by virtue of temporary maladjustments, such as exist in automobile tires and in petroleum, the latter being already on the way toward correction. With upward of 15,000,000 automobiles registered in the United States at the beginning of this year, an increase of two and one-half million or so in twelve months, there is bound to be a great consumption of petroleum, tires and the things entering into them, even if the needs of the railroads and the exigencies of housing be neglected.

Conserve Our Manganese Ores

HIGHLY important findings have just been made public regarding the American manganese situation. In a 14-page pamphlet the report of a committee of the Mining and Metallurgical Society of America, abstracted on another page, covers an exhaustive investigation of domestic resources of high-grade manganese ore. Something like 1850 manganese deposits, alleged deposits and prospects have been surveyed and all phases of this industry discussed. Only a two years' supply—or at best four years'—of high grade ore exists. The committee summarizes its findings as follows:

> The domestic resources of ferro-grade (high grade) and chemical (manganese) ores of the United States are so out of balance with the major foreign resources that under natural conditions of international exchange, imports of such ores into the United States can be efficiently stopped only at great cost.
>
> Nevertheless, should legislation be enacted which would effect a measurable substitution of domestic for foreign ferro-ores, the chief result, aside from the cost, would be the dangerous depletion of reserves which are totally inadequate for the country's needs.

These conclusions, arrived at after several years' study, bear out the view repeatedly expressed in these columns, that our own resources of high-grade ore, small as they are, should be conserved for emergency and defense use; also that a high tariff on the foreign ore is unwise and an added tax on the steel industry and on steel consumers. The present tariff, involving a high duty on the ore, and because of that a high duty on ferromanganese, is directly contrary to the conclusions above. The merits of a duty on ferromanganese are not involved, nor is the question of fostering a domestic ferromanganese industry. The present manganese duties afford a protection of about $7 per ton to the producer of ferromanganese, but they involve an attempt to give a larger measure of protection to a domestic manganese ore industry that for all practical purposes is non-existent.

Scrap in Steel Making

PRODUCTION of pig iron in the United States in 1923 is officially reported by the American Iron and Steel Institute at 40,361,146 tons. Full details were given in our last issue. The monthly blast furnace reports of THE IRON AGE had reported the production quite accurately, so that interest now is more particularly in the distribution of output by grades. Our total for the year, excluding charcoal pig iron, was 40,059,308 tons, while the official report now shows 40,109,969 tons, making a difference of only one-eighth of one per cent. Charcoal iron production was 251,177 tons, so that the official total of pig iron for the year is 40,361,146 tons. This is an increase over the previous record, made in 1916, of 926,349 tons, or 2.35 per cent.

Never before had it taken six years to make a new record in pig iron. The longest interval previously, in the seventy years during which precise statistics of production have been gathered, was the five years 1874-8, the next longest being the four-year interval 1891-4. New records were made in 15 of the 25 years prior to 1916, or three-fifths of all, and precisely the same showing was made by the preceding 25 years.

The production by grades is of particular interest in its bearing on the question of scrap supply, though it needs to be emphasized that while the computation so frequently made, comparing the production of steel-making pig iron with production of steel ingots and castings, indicates the average proportion of scrap used, it does not necessarily show precisely and accurately the amount of old material available. The major part of the scrap is works scrap, and if practice should change in the direction of greater or less cropping the relation of pig iron to ingots would be changed correspondingly. If the steel works could produce a sounder ingot they would be robbed of a certain amount of scrap, but they would not lament the fact or call in the police.

It will be of interest, however, to develop in a simple way what the statistics really do show as to the varying relationship between pig iron and steel. As simply the fluctuations are to be studied, spiegeleisen and ferromanganese used in steel making may be disregarded, also the limited tonnage of steel-making iron used in iron foundry practice. In the table below the first column gives the production of steel ingots and castings, the second column the production of Bessemer and basic pig iron, and the third column the percentage relation between pig iron and steel. The total production of steel in the 12 years covered by the table is divided by the total of the pig iron, giving an average for the tonnage of the 12 years, which is 71.0 per cent. The relatives in the fourth column are obtained by dividing the percentage shown for each year by this average of 71.

Fluctuations in Relationship Between Bessemer and Basic Pig Iron and Steel Ingots and Castings

	Steel Gross Tons	Pig Iron Gross Tons	Pig to Steel Per Cent	Pig Relative to Average
1912.....	31,251,303	23,081,901	73.9	104
1913.....	31,300,874	24,126,806	77.1	109
1914.....	23,513,030	17,529,814	74.6	105
1915.....	32,151,036	23,616,520	73.5	103
1916.....	42,773,680	32,106,544	75.0	106
1917.....	45,060,607	31,386,394	69.6	98
1918.....	44,462,432	31,671,140	71.3	100
1919.....	34,671,232	24,470,065	70.6	100
1920.....	42,132,934	28,799,806	68.4	96
1921.....	19,783,797	13,348,286	67.5	95
1922.....	35,602,926	21,654,570	60.9	86
1923.....	44,500,000	31,473,099	70.7	100
Average...	35,600,321	25,272,079	71.0	100

It will be seen that, disregarding 1923, there was a very marked tendency for the proportion of pig iron to decrease. The three years, 1912-3-4, showed an average of 106, while the three years, 1920-1-2, showed 92. The influence of scrap left over from the war doubtless was felt, but this would hardly explain the discrepancy, for in the three years there was a deficiency from the average of more than 5,000,000 tons, and even at that the higher proportion in the earlier years would have to be accounted for. As to 1923, it appears to have been a year of replenishment of pig iron stocks after the depleting influence of the coal strike of 1922.

IF Germany's manganese ore receipts are any gage of her steel output, then the 1923 production was very small. There are no German statistics, but some figures from a British source

show that the manganese ore imports into Germany in 1923 were only about 22.7 per cent of those of 1922, or 67,650 tons, compared with 297,900 tons. Before the war Germany was a large consumer of manganese ore, although Bessemer steel did and still does constitute a very considerable portion of the total output. Ferromanganese was even exported. It is being offered to American consumers now. Swinging since the war more and more to open-hearth steel, Germany would need manganese in increasing quantities. Its small consumption last year shows how seriously unsettling the Ruhr occupation was to the entire German industry.

Set-Backs for Radicalism

WHEN there is so much that is discouraging in connection with legislation and investigation at Washington, it is gratifying to note some signs of sound reasoning that is tending to halt radicalism. The decision of the Supreme Court declaring that the Federal Trade Commission has no authority to direct "fishing expeditions" into private papers in the hope that they may disclose evidence of crime will put a stop to such encroachments. A decision of this kind was to be expected from the highest court in the land, but there is also evidence that in the United States Senate, where radicalism has more than a foothold, strong opposition is developing to anything contrary to the best traditions of the country.

A test vote was taken when the so-called Norbeck-Burtness crop diversification bill was defeated in the Senate by a substantial majority. This bill proposed the appropriation of $50,000,000 to be lent to farmers in a few of the States in the Northwest to aid them in the purchase of cattle and other livestock. Among the Senators in opposition was a new member of that body, Senator Bruce of Maryland, who on more than one occasion of late has shown that he is a man of great ability and high character. Senator Bruce declared his irreconcilable opposition to the bill. Taken alone, it might be considered an exceptional departure from sound principles of public policy, to say nothing of sound constitutional principles, but when connected with other bills looking to Government ownership of railroads and various measures to assist the farmers and lead to larger participation by the Government in the private business of the individual, he found it a clear indication of a steady drift in the Northwestern States toward State socialism.

Senator George of Georgia also spoke with great vigor, saying that the American farmer will never be assisted back to his feet by any proposal which simply piles upon the whole body of the people an enormous tax burden, and that he will never be assisted by paternal schemes of government. "Disguise them as you may," said the Senator, "find for them an excuse in previous mistakes of the Congress, if you please, and you have laid the foundation for a communism in this country that is destructive of our Government and of every principle that has made the American farmer the one independent, conservative and outstanding element in our history." Both the Senators who thus spoke are learned in the law and the Senator from Georgia has been a justice of the Supreme Court of his State. In the face of such challenges the Congressional sponsors for radical proposals will find it stern business to make any headway. In the Northwest unsound teaching has found some lodgment, but there is no reason to doubt the sober sense of the vast majority of the American people or that on a popular vote the result would be any less decisive than it has been thus far in the tests made at Washington.

The preliminary report on the Mineral Production of Ontario in 1923 states that no producing iron mines were in operation in Ontario during that year. Shipments from storage of beneficiated magnetite in the form of briquettes by Moose Mountain, Ltd., totaled 30,451 net tons, of which all but 7590 tons was consigned to the Steel Co. of Canada at Hamilton, Ont., for experimental work under observation of the Iron Ore Committee.

At the annual meeting of the New England Iron League held recently at the Exchange Club, Boston, William E. Clark, W. E. Clark Co., Boston, was elected dictator, and Charles N. Fitts, New England Structural Co., Boston, secretary. Charles H. Carter, Bethlehem Steel Corporation, Boston, was reelected treasurer. Approximately 25 attended the installation of officers.

BOOK REVIEWS

Current Economic Affairs. By Walter Renton Ingalls. Pages 211, 5¼ x 8½ in. Published by G. H. Merlin Co., York, Pa. Price, $2.50.

In January, 1916, Sir George Paish contributed an article to a New York daily newspaper the theme of which was that it was an illusion that any country could benefit economically by the existence of the war. The United States, not being engaged in the war, would merely suffer less than the belligerents. Afterward we also became a belligerent.

More than five years after the war Dr. Ingalls justly feels constrained to publish a book to combat the surviving illusion that we benefited by the war and to urge that we take heed to our condition and get to work so as to restore a sound economic condition.

As the author states in his preface: "This book is mainly a collection of papers that have previously been delivered and published. Many of them were originally published in *Mining and Metallurgy*. The paper on 'The Distribution of Wealth in the United States' appeared first in THE IRON AGE. Several of the papers, however, are new."

The bock deals both with physical and economic conditions and with the state of mind. One of the mental states is represented in the desire to "Soak the rich" in connection with which the statement has been widely circulated that 65 per cent of the wealth is owned by 2 per cent of the people. The article originally printed in THE IRON AGE (Oct. 4, 1923) showed that the upper conceivable limit would be 46 per cent, the lower limit 23 or 25 per cent, and the probable proportion about 30 per cent.

We are better off than ten years ago if we have more goods and service. Serious doubt is raised whether we have as much per capita. Certainly the quantity of goods and service has not increased in like ratio with the increases of previous decades, or than, presumably, it would have increased had there been no war.

Apart from the matter of the total there is the matter of the distribution. Town labor has become much better off relative to the farmers and the white collar class. Necessarily this is at the expense of the latter, though many people have to have this explained to them and some will not believe it even then. Dr. Ingalls has some doubts, however, whether town labor is really in better position than it would now be in if these things had not occurred.

While expressing much doubt whether the scale of living, on an average of all the people, has improved, the author points out that an improvement in living could occur without our progressing as rapidly as before the war by our saving less, for he has it that before the war we were saving about 15 per cent of our income, but lately only 6 to 7½ per cent.

Merely as an illustration of the quantitative manner in which various things are appraised, mention may be made of a table which shows not only the familiar figures of the expenditures in new construction, but also estimated cost per square foot, the number of square feet being thereby deduced. The computations show much less construction, in square feet, both during the war and after the war than before the war.

The author insists that something must be done and that the engineers, not the politicians, should chart the way, but says frankly: "Anyone who imagines that the inevitable readjustment of economic equilibrium is going to happen without disturbances and injuries is living in a fool's paradise."

There must be creation of more will to work. Hours of labor have been reduced too much. Trade union restrictions are particularly bad for our economic welfare. We have economic restrictions that ought to be removed. The first mentioned of the general restrictions is the tariff. Work is the chief thing that impoverished Europe has to sell. We want payment of European debts to us and we want to sell to Europe, but we say specifically that we do not want to let our people buy freely the products of Europe's work.

Another great restriction is "the vicious system of Federal taxation, which is founded on the fallacies that the American people became rich out of the war and that there has been an increased concentration of wealth among a relatively small class of the people." Another is the tying up of the railroads. The Sherman and Federal Trade Commission laws are both in their intention the opposite of trade restriction, but practically have become restrictive owing to the manner of administration. The Clayton law, on the other hand, "is clearly an economic restriction of the first order."

Engineering Economics. By John Charles Lounsbury Fish. Second Edition. Pages 312, 9⅛ x 5⅞ in. Published by McGraw-Hill Book Co., Inc., New York. Price, $3.

Professor Fish's book deals with those business problems which require engineering knowledge for their solution. The fundamental problem is to find which of two or more opportunities for employing capital in engineering work is the most desirable.

Being written as an instruction book for students, the book is remarkably well arranged with headings, subdivisions and catchwords in bold-faced type, to develop the subject in regular order, from the anaysis of the investment problem to the use of accounts and statements. Many of the principles become known more or less completely to engineers and manufacturers during the course of a business life, but there are very few such men whose abilities would not be broadened by a careful reading of the book.

The various methods of estimating costs of projected structures; of operating as an individual, or with partners, or through a corporation; the ways of obtaining funds, by borrowing, preferred and common stock, bonds, and notes, and the making up and analysis of operating and financial statements, are all treated lucidly and in well-arranged sequence.

The conclusions follow clearly from the analysis, and are often most happily expressed. Borrowing money, considering the owner's annual yield on his capital, holds out the advantage of making good business better; but threatens the disadvantage of making bad business worse. Investment is an outlay with a view to a specified return; speculation, an outlay with a view to an unspecified return.

Promotion is the conscious effort required to create a business unit, and the promoter differs from all the other persons who may have conceived the idea that it would be profitable to produce or sell some particular service, in that he is willing to venture his own work, money, credit and reputation in bringing about the formation of the enterprise.

The advice about writing and arranging an engineering report, though addressed to students, would be useful to many an engineer and accountant. Particularly good is the test laid down for the excellence of the report—that no one of the men who is to read it shall feel impelled to stop at any point to ask for explanation, more facts, assistance in finding what he wants, or corroboration of evidence.

Of the total number of pages, nearly one-third are taken up with an appendix containing tables for interest, sinking fund and depreciation tables, a long list of books of reference, and a series of problems for students. The table of contents and index appear to be sufficient for ready reference to the subjects treated.

National Research Council

Activities of the National Research Council in the fiscal year ended June 30, 1923, are covered in a 20-page pamphlet prepared by Vernon Kellogg, secretary. It deals with activities of the various divisions and with the research work in physical, chemical, geological, geographical, medical, biological, agricultural and other sciences, and lists at the end 49 publications along these and allied lines, which have been put out from time to time and are for sale by the council at Washington. A companion volume of 56 pages gives the organization and membership, divided into various committees or groups, charged with carrying on the work of the council.

Iron and Steel Markets in Europe

Improved Franc Exchange Helps England—Largest Pipe Order Placed—German Iron Prices Lower—French Material Scarce—Belgian Situation Improved

(*By Cable*)

LONDON, ENGLAND, March 25.

PIG iron sales have improved, both for domestic and export markets, now that prices are more stabilized, while Continental competition has been extinguished on improvement in the franc exchange rate. The general outlook, consequently, is more hopeful.

Hematite demand is moderate. Export inquiry is broadening but there have been few substantial sales. Foreign ore is dull. Bilbao Rubio nominally is 23s. 6d. ($5.04), c.i.f. Tees.

Finished steel generally is dull; a shipyard stoppage is possible. There is little export buying and domestic consumers are awaiting lower prices. The London, Midland and Scottish Railway has placed orders for 500 locomotive boilers with Ruston & Hornsby, Ltd., Lincoln.

British Mannesmann Tube Co., Ltd., London, has been awarded an important contract for welded and riveted pipes by the Tata Power Co. of India. It is the largest pipe order ever placed in the United Kingdom.

Continental markets are disorganized by the appreciation of French franc rates, consumers being reluctant to commit themselves and sellers not being anxious to quote. Luxemburg plants are reported well sold for three months ahead. Prices generally are nominal. Up to £8, f.o.b. (1.53c. per lb.), was quoted in one instance for merchant bars. The transport situation in Belgium has eased but still is complicated.

Tin plate is firm as regards makers, but second-hands are weaker, following the slump in tin. Most makers are asking up to 25s. ($5.36) basis IC, f.o.b. There have been fair export sales on Continental account and also to Scandinavia. The Far East is dull.

Galvanized sheets are weak, on poor demand, and makers are more inclined to make concessions if attractive specifications are offered. South America has purchased some small parcels for quick shipment. India is dull.

Far Eastern specifications for black sheets are reduced £1, Japan 6 x 3, 13's, 107 lb. being now £20 5s. (3.88c. per lb.) and 112 lb. now £20 (3.83c. per lb.), both f.o.b. Other demand is quiet.

High Costs and Impending Labor Troubles Make Prospects Gloomy—Curtailed Production Probable

LONDON, ENGLAND, March 6.—The anticipated revival of business in iron and steel is still far from being realized, even in part. There seems to be quite a buyers' strike in force, certainly as far as overseas purchasers are concerned, and there has been little business passing during the past two weeks. Continental pig iron has been offered at low prices, but even these are difficult to understand as, when it comes to approaching producers on the other side, supplies are practically unobtainable. Nevertheless there is, of course, a lot of material due to come in under existing contracts, which will tend to keep domestic consumers from buying afresh until the contracts have been fulfilled.

In the meantime, pig iron producers on this side have tried to meet the situation by making price reductions in driblets, and it is only within the last week that a more or less drastic cut was made, chiefly made possible by a drop in the fuel market, and last Tuesday the price of No. 3 Cleveland G. M. B. was marked down 1s. 6d. to a level of 93s. ($20, at $4.30 per £1). At this price a little substantial buying developed, but whether this can be maintained it is difficult to say, as consumers as a whole still purchase to cover only their immediate requirements.

High Costs Prevent Lower Prices

The makers claim, naturally, that the high costs mitigate against prices being stabilized at any mate-

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British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.29 per £1, as follows:

Durham coke, delivered	£1	12½s.			$6.97	
Bilbao Rubio ore†	1	4			5.15	
Cleveland No. 1 foundry	4	15			20.38	
Cleveland No. 3 foundry	4	11½			19.63	
Cleveland No. 4 foundry	4	10			19.31	
Cleveland No. 4 forge	4	9			19.09	
Cleveland basic	4	15			20.38	
East Coast mixed	4	19½	to £5	0s.	21.34 to	$21.45
East Coast hematite	4	19	to 5	0	21.24 to	21.45
Ferromanganese	17	0			72.93	
Rails, 60 lb. and up	8	15	to 9	15	37.54 to	41.83
Billets	8	0	to 8	5	34.32 to	35.39
Sheet and tin plate bars, Welsh	8	18¾			38.34	
Tin plates, base box	1	4½	to 1	5	5.25 to	5.36
					C. per Lb.	
Ship plates	9	10	to 10	0	1.82 to	1.92
Boiler plates	13	0	to 13	10	2.49 to	2.59
Tees	9	10	to 10	0	1.82 to	1.92
Channels	8	15	to 9	5	1.68 to	1.77
Beams	8	10	to 9	0	1.63 to	1.72
Round bars, ¾ to 3 in.	10	10	to 11	0	2.01 to	2.11
Galvanized sheets, 24 g.	17	17½	to 18	0	3.43 to	3.45
Black sheets, 24 gage	13	10	to 13	15	2.59 to	2.63
Black sheets, Japanese specifications	15	5			2.92	
Steel hoops	12	10	& 12	15*	2.39 &	2.44*
Cold rolled steel strip, 20 gage	17	2½			3.28	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(*Nominal*)

Foundry pig iron:						
Belgium	£4	4s.	to £4	5s.	$18.02 to	$18.23
France	4	4	to 4	5	18.02 to	18.23
Luxemburg	4	4	to 4	5	18.02 to	18.23
Billets (nominal):						
Belgium	6	0	to 6	5	25.74 to	26.81
France	6	0	to 6	5	25.74 to	26.81
Merchant bars:					C. per Lb.	
Belgium	7	0			1.34	
Luxemburg	7	0			1.34	
France	7	0			1.34	
Joists (beams):						
Belgium	6	10	and upward		1.25	
Luxemburg	6	10	and upward		1.25	
France	6	10	and upward		1.25	
Angles:						
Belgium	8	0	to 8	5	1.53 to	1.53
⅛-in. plates:						
Belgium	7	15			1.48	
Germany	7	15			1.48	
¼-in. plates:						
Luxemburg	7	15			1.48	
Belgium	7	15			1.48	

rially lower level, and they are, of course, face to face with a possible trouble in the coal fields before long, which will once more bring stagnation. The only thing to be done at present is to cut down output, and several furnaces have, therefore, already been put out of commission.

Hematite has had rather a steadier tone, though the price has fallen, but most makers of East Coast mixed numbers are not inclined to book orders at less than about 100s. ($21.50) per ton. The dullness in the steel trade is reflected in the poor demand for hematite from domestic consumers, coupled with the competition in basic on Continental suppliers.

Poor Prospects in Finished Steel

Trading in the finished iron and steel markets has been dull. Makers generally are pretty busy on their contracts and subcontracts in connection with the railroad and shipbuilding schemes, but there is no life in the situation of ordinary merchant export trade. Prices are high, but makers claim that costs are too great to allow of any keen cutting, and it looks as if production will have to be curtailed before long, unless the position changes.

Awarding to Dorman, Long & Co., Middlesbrough, of the £4,217,000 contract for the construction of the North Shore Bridge across the harbor at Sydney, N. S. W., is, of course, a matter for congratulation, but of course, steel rollers will not gain any material benefit for some little time, as it will be a couple of years before any of the steel material will be required.

It is difficult to understand exactly what is the position on the Continent, but certainly works seem to have been booking fairly heavily and have little to sell before the end of April.

GERMAN IRON AND STEEL MARKET

Foundry Iron Prices Lower—Drop of 20 Per Cent in Two Months

(*By Radiogram*)

BERLIN, GERMANY, March 24.—No. 3 foundry pig iron is now quoted at 88 gold marks per metric ton. ($21.30 per gross ton. This compares with 110 g. m. or $26.60 on Jan. 24.)

FRENCH IRON AND STEEL MARKET

Material Scarce as Makers Concentrate on Exports —Recovery in Exchange Helpful

PARIS, FRANCE, March 14.—The situation of the French market is critical, especially for buyers, and the only materials available are in the hands of middlemen, who therefore are practically the masters of the hour. Almost all the producers, and even the transformation plants themselves, due to the uncertainty of their supply in raw matters, have stopped taking orders. The cause for such a situation is to be found in the unusual quantity of orders booked for export lately and also in the output being reserved by the producers for the outside markets, of more remunerating profit, due to the depreciation of the franc.

No commitments are being taken further ahead than April, owing to the unsettled conditions in the Ruhr. Prices are unsteady and irregular, depending mostly on the engagements of the plants and on the extent the increased salaries, costs and taxes have been accounted for.

Consumers are angry at the producers' keeping their output for export to the detriment of the domestic market; there is much desire here for an intervention of the Government, regulating export trade and preventing the prices from reaching the gold parity. For about two days the exchange has fallen with the same rapidity as it had gone up, and this of course has been quite prejudicial to the industrials and traders whose needs in foreign bills had to be covered at high rates. If, as believed, the pound gets back to 80 francs after the vote of the financial projects of the Government by the Senate, all prospects of inflation will be definitely laid aside.

The last Brussels market has been without interest, due to the fall of sterling and dollar, the plants well booked ahead refusing to accept the prices offered, to the exclusion of these quoted in pounds.

Prices indicated below have applied since the beginning of the week; it is evident that, with the fall of Anglo-Saxon exchange, prices are now easier.

Coke.—During the first ten days of March through Ehrang and Aix-la-Chapelle and during the two following days through Ehrang, the Office de Répartition des Cokes allemands (ORCA) has received 128,472 tons coke from the Ruhr, or a daily average of 11,780 tons for the first ten days; on March 6 and 7 over 16,000 tons, which is equal to the best days of before the occupation.

In Belgium, the price for metallurgical Ruhr coke has just been fixed at 170 fr. per ton (raised by 5 fr.) dating March 1 (or about 149 fr. in French currency). [$7.03 per gross ton.]

Pig Iron.—There is great scarcity in spite of the increased production and it is now quite impossible to deal further than end of April. For instance, if some plants are willing to accept orders for May, they intend to fix the prices in April only. Actually, No. 3 PL, around 400 fr. ($18.29 per gross ton) the previous week, is quoted 415 fr. ($18.97), or a few francs under the export price. This is rather surprising, as the rates for coke have been lowered 60 fr. since January. In hematite, quantities are larger but prices are strongly upward and bear on 530 to 550 fr. per ton, ($24.23 to $25.15) at mills. Hematite iron produced by the electric oven is worth about 500 fr. ($22.86). For export, the price for No. 3 chill-cast iron is quoted between 490 and 500 fr. Belgian, ($19.63 and $20.04); and 475 to 485 fr. ($19.04 to $19.44) for Thomas iron. Some French iron has been sold to the United States on the basis of $21.50 to $22, c.i.f. Atlantic port, and $24.75, all charges included.

Ferroalloys.—All manganese alloys are increasingly dearer, due to the rise of sterling: 76 to 80 per cent Mn. is quoted 1850 to 1875 fr. ($84.58 to $85.72); spiegeleisen, 10 to 12 per cent, 700 fr. ($32); 18 to 20 per cent, 875 fr. ($40). Caucasian manganese ore, 48 per cent, valued 485 fr. ($22.18) per ton last week, must have gone up with the pound.

Semi-Finished Products.—Very few sales recorded. The nominal prices are, for inland: 56 to 58 fr. ($25.60 to $26.52) for blooms; 60 to 62 fr. ($27.43 to $28.35) for billets; while the export prices are raised to 650 to 670 fr. ($29.72 to $30.63) for blooms; 690 to 720 fr. ($31.55 to $32.92) for billets.

Rolled Steel.—Some rare orders have been dealt in at the new prices and under the following conditions: Those in need of a tonnage of a certain shape have placed the order in a plant having that very shape in fabrication. Under these circumstances it is impossible to deal, the plants being booked to capacity. The ruling quotations are as follows: 65 to 69 fr. (1.37c. to 1.45c. per lb.) for beams; 67 to 70 fr. (1.41c. to 1.47c. per lb.) for bars; 90 to 92 fr. (1.90c. to 1.94c. per lb.) for hoops; 82 to 85 fr. ($37.50 to $38.86) for wire rod, per 100 kilos in the East region. Compared with a month ago, there has been a general increase of about 20 per cent. A recent adjudication of the State Railroads involves the following items: Angles, 25 x 25 x 3 mm. up to 80 x 80 x 10 mm., for 83.50 to 89 fr. (1.76c. to 1.87c. per lb.); other angles of unequal dimensions, 87 to 93.70 fr. (1.83c. to 1.97c. per lb.). F.o.b. Antwerp, prices for joists (beams) are £6 5s. (1.20c. per lb.); for rolled products, £6 10s. to £6 13s. 6d. (1.25c. to 1.28c. per lb.); and £8 5s. to £8 10s. (1.58c. to 1.63c. per lb.) for rods.

Sheets.—Same situation as rolled steels, but the increase would even be proportionally larger. Approximate prices range about 70 fr. for large flats; 74 to 82 fr. (1.56c. to 1.73c. per lb.) for heavy sheets; medium, 90 fr. (1.90c. per lb.); light, 110 to 115 fr. (2.32c. to 2.42c. per lb); all per 100 kilos, at mills. F.o.b., heavy

Thomas grades are quoted £7 10s. to £7 15s. (1.44c. to 1.49c. per lb.); 3 mm., £8 5s. to £8 10s. (1.58c. to 1.63c. per lb.).

Foundry.—More quiet; the plants are all fairly busy but prices are still under discussion, although steady. In malleable iron, the production is increasing. Some iron castings have been sold on the average of 188.50 fr. per 100 kilos (3.97c. per lb.); others, of 50 kilos, 128.77 fr. (2.71c. per lb.), delivered. Some cast steel special chairs (12 to 26 kg. or 27 to 58 lb. in weight) have been sold at 224.45 fr. (4.73c. per lb.) per 100 kilos; others weighing 15¾ and 24 kilos (35 and 53 lb.) were adjudicated at 225.15 fr. (4.74c. per lb.) per 100 kilos.

BELGIAN IRON AND STEEL

Prices Maintained and Production Increasing—Semi-Finished Steel Is Stagnant

BRUSSELS, BELGIUM, March 6.—The Belgian iron and steel market remains favorable, prices are being maintained on their previous level and the session of Wednesday last at the Brussels Bourse has been one of consolidation. The political situation—Belgium has now been for eight days without a cabinet—and the pressure of exchange are detrimental to business, but as the market is practically void of competition, domestic producers do what they want. Lorraine and Luxemburg plants on orders f.o.b. Antwerp are quoting higher terms than the Belgians.

Nevertheless, the whole aspect of the market is perhaps a little less favorable than previously, as some middlemen or speculators, having accounted for a larger increase and fearing now a fall in prices, are liquidating their position at prices somewhat lower than those of the plants. Prices remain rather high. On the other hand, if the accords with the Micum are concluded, a return of the Germans on the market is expected. [See page 886, THE IRON AGE, March 20.]

Pig Iron.—Meanwhile production is increasing, several furnaces will be relighted in the first two weeks in March, this being contemplated with a good deal of satisfaction as the demand is active and material scarce. No. 3 foundry iron is quoted between 480 and 500 fr. ($17.29 and $18.01, at 28.20 fr. per $1), either delivered or f.o.b.; basic iron is worth 465 to 475 fr. ($16.75 to $17.11).

Semi-Finished Products.—The market is dead, sellers refusing to quote and purchasers, beginning to hold off, are living on their stocks. The following prices are recorded: blooms, 650 to 660 fr. ($23.42 to $23.78); billets, 675 to 700 fr. ($24.32 to $25.22).

Steel.—Good activity and steady prices; beams are sold at 750 fr. (1.21c. per lb.) on the inland market and 675 fr. (1.09c. per lb.) for export, or £6 7s. 6d. f.o.b. Bars are 775 fr. (1.25c. per lb.) on the inland market and £6 10s. to £6 13s. 6d. minima (1.25 to 1.28c. per lb.) for export; rods, 925 fr. (1.49c. per lb.) at home and £5 8s. 10d. (1.05c. per lb.) for export; rails, 750 fr. ($27.02) on the inland market and 700 fr. ($25.22) for export.

Sheets.—Same favorable disposition. The export price for heavy gages is £7 12s. 6d. to £7 15s. (1.46 to 1.48c. per lb.) f.o.b. Antwerp, in basic steel; 3 mm. sheets are worth £8 5s. to £8 10s. (1.58 to 1.63c. per lb.).

Scrap.—High prices. Heavy scrap is sold at 400 to 410 fr. ($14.41 to $14.77); furnace scrap, in poor demand, is sold around 360 to 370 fr. ($12.97 to $13.33); open-hearth scrap is worth 390 to 410 fr. ($14.05 to $14.77), while machine castings are quoted around 470 to 480 fr. ($16.93 to $17.29).

INSTITUTE OF METALS

Brass, Bronze and Future of Non-Ferrous Metals Discussed at March Meeting in London

(Special Correspondence)

The annual meeting of the British Institute of Metals was held in London on March 12 and 13. The newly elected president, Prof. Thomas Turner, Birmingham, in the course of his inaugural address predicted that the supply of certain base metals would be exhausted before either coal or iron ceased to be produced. The iron ores which contained five times the average iron content of the earth's crust might be worked with profit; but with copper it was necessary to have a concentration of 2000 times ore more; and the same was true of lead and zinc. That was one of the reasons why the workable deposits of these base metals would be exhausted earlier than in the case with iron. Of aluminum alone there appeared to be an unlimited supply; but the heat energy required to produce aluminum from pure ores was considerable; while from many of the silicates the extraction of aluminum would be still more difficult.

Future of Non-Ferrous Metals

It was evident, therefore, he said, that the future of the non-ferrous industry depended on the extension of scientific knowledge in the direction of broadening the sources of supplies, diminishing the cost of extraction, improving the methods of treatment, reducing corrosion and waste, and dealing properly with residuals. Professor Turner gave examples of the scale on which industrial research is conducted in private laboratories in the United States of America. He quoted the opinion of Sir J. J. Thomson that in many cases, "much of the work in hand is as purely scientific in type as that which is conducted at the Cavendish Laboratory at Cambridge." He referred to the enthusiasm of the staffs at private laboratories in the United States, and their knowledge of the latest developments in their subject, while the general tone in these laboratories, (according to Thomson) was similar to that of an English university.

Casting Temperature of Bronze

Among the papers presented was one by Francis W. Rowe, dealing with the "Effect of Casting Temperature on the Physical Properties of a Sand-Cast Zinc Bronze" of the following composition:

> Copper, 87.96 per cent; tin, 6.08 per cent; lead, 0.52 per cent; zinc, 5.31 per cent; phosphorus, 0.021 per cent, and iron, 0.02 per cent.

Six boxes of test bars were molded in green sand. Each box contained two 14 x ⅞ in. diameter bars. These were run with a 1¼-in. diameter down runner terminating in a splay to both bars. The riser was exactly similar to the runner. The boxes were cast from the same pot of metal at different temperatures. The temperature was taken immediately prior to pouring with a Foster base-metal thermocouple. The results of the tests on these bars are tabulated in the paper.

The tensile strength, the elongation and impact figures showed a marked optimum with a casting temperature of 1130 deg. C. The Brinell hardness figure rose steadily as the casting temperature fell, which feature is common to all gun-metals and bronzes. The microscopic appearance showed those bars, which were cast at higher temperatures, to have the eutectoid more finely divided than those cast at the lower temperatures. The macroscopic appearance showed the grain size to fall progressively with the casting temperature, there being a marked difference between each sample.

Brittle Ranges in Brass

D. Bunting, in a paper, "Brittle Ranges of Brass, as Shown by the Izod Impact Test," described a method of testing for brittleness in brass by means of the Izod impact test on a series of alloys varying in composition from 99 per cent copper to 52 per cent copper. The tests were made at temperatures between 15 and 700 deg. C. Brittleness occurs in all brasses containing less than 90 per cent copper, being first encountered in 90:10 brass, in which the brittle range exists from 470 to 540 deg. C. With the increase of zinc the range

expands, and in the case of a 70:30 brass occurs between 325 and 800 deg. C. At a composition of 65 per cent copper the range extends from 325 deg. C. until the solidus is entered. The $\alpha + \beta$ alloys are found to possess a recovery of toughness at high temperatures. The brittle ranges of the 58:42 alloy extend from 325 to 450 deg. C., above which temperature the recovery of toughness occurs; any further increase of temperature causes the plasticity of the metal to become more pronounced. The alloys comprise those used for hot stamping, hot rolling and similar work.

The alloys were examined in two conditions, chill cast and annealed, and it was found that with the rapidly cooled alloys there was a general increase in the brittle ranges, due in the case of the α alloys to coring, and in the case of $\alpha + \beta$ alloys to the production of increased quantities of β. The brittle ranges are believed to be due to the thermal inversion occuring in β at a temperature in the neighborhood of 470 deg. C. It is also probable that a similar thermal change occurs in the brasses, this being responsible for the brittleness of the α alloys.

Fatigue Failure of Brass Tubes

A paper by W. E. W. Millington and Prof. F. C. Thompson, entitled "Investigation of a Fatigue Failure of Brass Tubes in a Feed Water Heater," describes a curious failure of brass tubes in an actual case of engineering importance. The apparatus in which the failure took place was a large water heater of the tubular type arranged for taking water inside the tubes, the steam passing on the outside. By a process of elimination the cause of failure was diagnosed as "fatigue," due to vibration of the tubes. New tubes, suitably stayed, were fitted, and the trouble ceased, but it still remained to consider the exact nature of the process by which the failure occurred.

In the account of this investigation, involving a study of the close-packed cubic material, the authors show how a movement on octahedral planes, which they term "easy glide" in distinction to "slip," is responsible for (1) plastic deformation in hot and cold working; (2) changes of packing from cubic to hexagonal; (3) mechanical twinning, and (4) fatigue. Stress-strain diagrams are discussed, taking the "easy glide" into account. This is developed to show the movement which will take place in an aggregate of crystals under cycles of stress and that, in certain circumstances, twin bars (Neumann lamellae) are cumulatively formed in the material which not only stiffen the crystals but also cause them to become internally stressed, until eventually failure results. Doubts are expressed as to the justification of thermal methods of determining the fatigue limit.

JOBBERS BUY FOREIGN STEEL

Bars and Shapes Bought in Small Lots—First Tender from Japanese Reconstruction Board

NEW YORK, March 25.—Sales of lots of a few hundred tons of Continental steel continue, a large part of the purchases apparently being by warehouses in and near ports, such as Boston, New York and Philadelphia. Since the first appearance of orders for foreign steel, the number of importers has rapidly increased, some quoting on material direct from the French, Belgian or German mill, others acting through British or Continental exporters and still others offering material through importers in the United States with close connections in Europe.

Quotations are understood to be slightly higher than a few weeks ago, but as low as 2.15c. per lb., delivered, is understood to be still possible. One importer offering tonnage to New York warehouses has, it is said, about 1700 tons of bars afloat of which about 700 tons is already under contract. A number of warehouses in New York as well as in Boston and Philadelphia have been purchasers of foreign steel and none seems averse to considering quotations. The first of the larger shipments of this material, largely bars and shapes, are beginning to appear, and the result of its actual condition is expected by importers to exercise considerable effect on future purchases, as several possible buyers are said to be awaiting an opportunity to examine the material.

Despite the fairly heavy sales of Continental steel that have been made and an evidence of continued interest by warehouses and consumers, importers look upon their present activity as only temporary, to be wiped out almost overnight by an upward movement of the European markets or a downward movement in the American market. Some point to the lower American export quotations now understood to be quite common as evidence of a decline.

As low as $55 per ton, c.i.f. Japan, is said to have been recently quoted on several hundred tons of structural material. The usual offering price of light gage black sheets, c.i.f. Japanese port, is said to be about $105 per ton today, a decline of $12 to $13 per ton since the earthquake. It is claimed that the usual export quotation figures back to 2c. per lb. or less, base Pittsburgh. That these lower quotations are the cause of a gradual increase in Japanese activity seems somewhat doubtful in view of the usual attitude of Japanese merchants and others to await a decline in the American domestic market. Rather, it would seem to be a healthier condition in Japan resulting from more progress toward reconstruction.

The first inquiry of the Japanese government since its purchase of a heavy tonnage of black and galvanized sheets and wire nails, immediately following the earthquake, has appeared. The "Fukkoin," or Metropolitan Reconstruction Board, has issued a tender through the usual export channels, for about 800 tons of sheet piling, which it is felt in some quarters may presage the beginning of continued activity for reconstruction.

Reports of heavy purchases by Japan in Continental markets, chiefly France, seem to be substantiated only in part. That Japanese purchasing in Belgium and France of iron and steel for reconstruction and other work has aggregated close to 100,000 tons, part of which has been delivered and part of which will be delivered in the next 30 to 60 days, seems evident, but the rumor that a French commission had been sent to Japan and obtained blanket contracts totaling more than 200,000 tons of various products cannot be confirmed.

Regardless of low Continental prices on other products, it seems evident that Japanese merchants and the government will buy the greater part of the black sheets needed, either in the United States or the United Kingdom. American black sheets are still considered in Japan as of first quality, with British black sheets of some brands close competitors. Those British sheets that are now one-pass cold-rolled are the most popular with Japanese buyers and that the cold-rolling is the principal consideration seems evident from the fact that Japanese in close touch with the market claim that "Comet," formerly one of the best British brands, is now less in demand by buyers than "Harvest" and "Raven," formerly considered of medium quality but lately sold as one-pass, cold-rolled.

Among current inquiries from Japan is a tender from the South Manchuria Railway Co. for 1100 sections of 80-lb. rails in various lengths and another tender from the same road for about 30,000 kg. (1750 pieces) of spring steel. The Dairen Kikai Seisakusho has been receiving bids on about 800 tons of plates, shapes and bars. Some wire rods are reported to have been purchased. The recent inquiry of the Okazaki Electric Railway for 6½ miles of 60-lb. sections is reported to have been placed with the Mitsubishi Shoji Kaisha, New York, which company also was awarded the 2 miles of 75-lb. sections by the Aichi Electric Railway. It is also reported that the 500 tons of sheet piling asked for by the Imperial Government Railways has been awarded to the New York branch of a Japanese export house.

Iron and Steel Markets

LARGER MILLS BUSIEST

Smaller Producers More Actively Competing

Railroad Track Work the Important Factor—Heavy Structural Bookings

Large-scale operations are still the rule with the leading producers of steel, and barring the slight reduction in automobile output, industrial consumption of rolling mill products is well maintained.

Railroad and structural orders were the main factors in the heavy tonnages put on the books in February, and relatively few producers shared in this business, the Steel Corporation being credited with fully half of it. Thus it comes that in some of the heavy products large runs are assured to the corporation and a few others for most of the second quarter, while on a variety of products on which 20 to 30 less prominent companies compete the future is not so well assured.

Under these conditions price concessions are being made by the smaller interests, and in Eastern districts Pittsburgh mills are being underbid to an increasing extent.

The Steel Corporation holds to its operating rate of 95 per cent, and its chief competitors at Chicago and Pittsburgh are not far behind, but in the Youngstown district ingot output is now around 85 per cent, against 90 per cent at the late peak. In some other districts independent companies have reduced operations slightly.

In the East new business in plates, shapes and bars is in lessened volume, and the tendency of buyers to keep just a little ahead of the mills is more evident in the Middle West. Chicago, with its heavy railroad demand, still leads in the rate of new orders.

Plates in the East are obtainable in moderate lots on a 2.25c., Pittsburgh, basis, and shapes and even bars are quoted frequently at 2.35c.

Weather conditions have been hard on the secondary movement of wire products, especially to agricultural districts, and mill operations are quite below par. Competition is keener, Pittsburgh prices being named at some mills outside the Pittsburgh district.

Railroads are pressing the mills for the rails they will begin to lay in April and for other steel called for by the largest program of track improvement in recent years. New rail orders include 25,000 tons from the Great Northern and 10,000 tons from the Northern Pacific. The Southern Pacific has come into the market for 130,000 tons.

The slowing down of automobile output at Detroit by about 15 per cent is substantiated. Sales of cars from stocks in the next six weeks will decide whether the February rate of operations can be resumed. The Ford Motor Co.'s purchase of 28,000,000 rim bolts and nuts is one of the largest ever made, being divided among three or four manufacturers.

Strip steel manufacturers are now not so well assured of good rolling schedules in April on the considerable part of their product commonly taken by automobile plants.

Structural steel bookings are again large, two items in the week's total of 47,000 tons being 18,650 tons for another section of the Philadelphia-Camden bridge and 15,000 tons for the steel works of the Ford Motor Co. Fresh inquiries call for no less than 60,500 tons, with public work taking a large share.

Railroad equipment buying includes 31 locomotives and 1100 steel underframes for freight cars. To the list of inquiries were added 570 freight cars.

Demand for bolts and nuts is not active and prices on semi-finished castellated and slotted nuts have been reduced about 10 per cent.

Weakness continues in pig iron, but demand is so limited that prices are not put to the test. At Cleveland the probability of a 50c. reduction in ore prices raises the expectation of lower pig iron. Silvery irons are $1 lower. German foundry iron has been delivered on the Pacific Coast at less than $23 on low ocean freights from Rotterdam. In the East little has been done in foreign low-phosphorus irons since the February sales at $26, duty paid, and later offers at $24.50.

A better business with South America is the only new feature in the export trade. Brazil is about to buy rails, but mills here will not meet the very low prices named in European bids.

The British Mannesmann Tube Co., Ltd., London, has just received from the Tata Power Co., India, the largest pipe order ever placed in the United Kingdom. British steel markets feel some relief from Continental competition with the advance of the franc.

THE IRON AGE composite price for finished steel has dropped from 2.746c. to 2.731c. per lb. and now stands at 162, calling the ten-year pre-war average 100.

THE IRON AGE composite pig iron price, which was $22.77 last week, is $22.73 today, the lowest in two months and more than $8 below last year's price.

Pittsburgh

Decreased Demand Likely to Be Followed by Gradual Decline in Prices

PITTSBURGH, March 25.—The tendency of steel buyers to keep close to the shore in the matter of purchase has been even more marked in the past week than it was recently, and already the development has begun to find reflection in steel plant operations. The decline has not yet been marked in the Pittsburgh district proper, but is plainly noticeable in the Youngstown district, where ingot production is about 85 per cent engaged as against fully 90 per cent at the peak of the fore part of this month. So many of the larger units of the Steel Corporation are located in the Pittsburgh

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Mar. 25, 1924	Mar. 18, 1924	Feb. 26, 1924	Mar. 27, 1923
No. 2X, Philadelphia‡	$24.13	$24.13	$24.26	$33.14
No. 2, Valley Furnace†	23.00	23.00	23.00	31.00
No. 2, Southern, Cin'ti†	26.55	26.55	26.55	31.05
No. 2, Birmingham, Ala.†	22.50	22.50	22.50	27.00
No. 2 foundry, Chicago*	**24.50**	24.00	24.50	32.00
Basic, del'd, eastern Pa.	21.50	21.50	22.75	30.25
Basic, Valley furnace	*21.75*	22.00	22.00	31.00
Valley Bessemer del. P'gh.	*24.76*	25.26	25.26	32.77
Malleable, Chicago*	**24.50**	24.00	24.50	32.00
Malleable, Valley	22.50	22.50	23.00	31.00
Gray forge, Pittsburgh	23.76	23.76	23.76	32.27
L. S. charcoal, Chicago	29.15	29.15	29.15	36.15
Ferromanganese, furnace	107.50	107.50	107.50	120.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	45.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	45.00
O.-h. sheet bars, P'gh.	42.50	42.50	42.50	45.00
Forging billets, base, P'gh.	45.00	45.00	45.00	52.00
O.-h. billets, Phila.	45.17	45.17	45.17	50.17
Wire rods, Pittsburgh	51.00	51.00	51.00	50.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.30	2.30	2.30	2.35
Light rails at mill	2.00	2.00	2.00	2.25

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*2.53*	2.57	2.57	2.825
Iron bars, Chicago	2.40	2.40	2.40	2.60
Steel bars, Pittsburgh	2.40	2.40	2.40	2.50
Steel bars, Chicago	2.50	2.50	2.50	2.84
Steel bars, New York	*2.69*	2.74	2.74	2.84
Tank plates, Pittsburgh	*2.35*	2.40	2.40	2.50
Tank plates, Chicago	2.60	2.60	2.60	2.84
Tank plates, New York	*2.59*	2.64	2.64	2.84
Beams, Pittsburgh	*2.35*	2.40	2.50	2.50
Beams, Chicago	2.60	2.60	2.60	2.84
Beams, New York	2.69	2.69	2.74	2.84
Steel hoops, Pittsburgh	2.90	2.90	3.00	3.30

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Mar. 25, 1924 Cents	Mar. 18, 1924 Cents	Feb. 26, 1924 Cents	Mar. 27, 1923 Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.85	3.85
Sheets, galv., No. 28, P'gh.	4.90	4.90	5.00	5.25
Sheets, blue an'l'd, 9 & 10	2.90	2.90	3.00	3.25
Wire nails, Pittsburgh	3.00	3.00	3.00	2.90
Plain wire, Pittsburgh	2.75	2.75	2.75	2.65
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.70
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$5.50

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$18.50*	$20.50	$21.00	$28.50
Carwheels, Philadelphia	18.50	18.50	19.50	27.00
Heavy steel scrap, P'gh.	*18.00*	19.50	20.50	27.00
Heavy steel scrap, Phila.	16.50	16.50	17.50	26.00
Heavy steel scrap, Ch'go.	*15.50*	16.25	17.50	23.50
No. 1 cast, Pittsburgh	20.00	20.00	21.00	28.00
No. 1 cast, Philadelphia	18.50	18.50	19.50	29.00
No. 1 cast, Ch'go (net ton)	*19.50*	20.00	21.00	26.50
No. 1 RR. wrot. Phila.	19.00	19.00	21.00	28.00
No. 1 RR. wrot. Ch'go (net)	*13.50*	13.75	15.50	21.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.15	$7.25
Foundry coke, prompt	4.75	4.75	5.00	8.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*13.87½*	14.12½	13.25	17.37½
Electrolytic copper, refinery	*13.50*	13.75	12.87½	17.12½
Zinc, St. Louis	*6.87½*	6.45	6.85	7.80
Zinc, New York	*6.72½*	6.80	7.20	8.15
Lead, St. Louis	*8.85*	9.15	9.25	8.20
Lead, New York	*9.00*	9.15	9.25	8.50
Tin (Straits), New York	*52.50*	53.75	55.00	47.37½
Antimony (Asiatic), N. Y.	12.00	11.00	11.00	8.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, March 25, 1924, Finished Steel, 2.731c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

March 18, 1924,	2.746c.
Feb. 26, 1924,	2.775c.
March 27, 1923,	2.789c.
10-year pre-war average,	1.689c.

Composite Price, March 25, 1924, Pig Iron, $22.73 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

March 18, 1924,	$22.77
Feb. 26, 1924,	23.88
March 27, 1923,	30.86
10-year pre-war average,	15.72

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district and that interest is so well provided with business that the lighter volume of buying is not felt here, especially as the leading local independent also is getting enough new business to supplement old orders to maintain the recent rate of ingot production. The present gait means such economical production that it is probable that decline in steel works activities here will be very gradual, and there will probably be some laying down of billets and other forms of semi-finished steel. It is figured such stocks will permit prompt shipments of finished steel in the next wave of activity without the necessity of waiting on smooth furnace operation that is usually difficult following a suspension.

Not only do present conditions point to a lower rate of steel works operation in the near future, but the distribution of existing business among the various manufacturers is so uneven as to forecast much price irregularity and softness. The largest tonnage now on makers' books is that in connection with railroad equipment and structural work, but comparatively few producers have shared in the allotments of the necessary steel. Those who fare poorly in these distributions, particularly in the East, now are "hungry" for business and are not paying much attention to the prices of Pittsburgh mills. Lower operating schedules of a number of automobile makers of the second quarter find rather full and prompt reflection in the decreased demand for those kinds of steel finding common use by that industry, and there is some doubt among strip makers of their ability to maintain a reasonably good rolling schedule in April.

The weather of the past six weeks is blamed for the

lower producing rate among automobile builders, but there is also the view that the plans of that industry for this year were a little too ambitious for full realization. Weather conditions have played havoc with the secondary movement of wire products, notably in those lines going to the agricultural districts, and this is felt in the demands upon the mills. Pipe business continues good, and there is no doubt about the tin plate market for the remainder of this half of year, but in all other directions the tendency now is to buy only what is required and that does not carry mill bookings very far into the future. Those inclined to be optimistic find satisfaction in the thought that with money so easy, a long period of dullness is improbable and that since there is no evidence yet of any material slowing down in consumption, the trade should adjust itself to the new order of buying, which is of frequent small lot purchases for a specified delivery. Easy money is in no small measure due to the fact that so little is tied up in large inventories, and it is not the easiest thing for some manufacturers to be content with short rolling schedules.

A further break in scrap prices in the past week has carried heavy melting steel almost $5 a ton below the high point reached early in February. The pig iron market is softer with basic grade off 25c. a ton and Bessemer available 50c. a ton below the recent price. The coke market is growing weaker with $4 now the top on furnace grade.

Pig Iron.—Hardly enough business is being done here to provide a very clear line on prices. We note one sale of 500 tons of basic at $21.75, Valley furnace, as compared with $22, the price which most makers lately have been naming. All makers had an opportunity to quote on this business and most of them named $22; that figure, however, cannot be regarded as the minimum any longer in view of the sale at 25c. less. Only small lots of Bessemer iron have changed hands and since none within the week under review have been at above $23, Valley furnace, that price must now be regarded as the ruling one, notwithstanding that some still are asking $23.50. Only small lots of foundry iron have been sold, but these have been at $23, Valley furnace for No. 2, and we still regard that as the market, though it is probable that a sizable tonnage would bring out a lower price. The market as a whole is untested and basic has a weak tone, with concessions very likely with appearance of inquiries of any considerable size. The Pittsburgh Crucible Steel Co. has banked one of its two furnaces at Midland, Pa., but the Pittsburgh Steel Co. has put on a furnace which has been down for relining. This leaves the number of furnaces in operation in this and nearby districts the same as a week ago, or 113 of a total of 140. Carnegie Steel Co. is figuring on starting up the one New Castle furnace now idle, but also expects to blow out one of this group when the idle furnace is started.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.75 to $22.00
Bessemer	23.00 to 23.50
Gray forge	22.50
No. 2 foundry	23.00
No. 3 foundry	22.50
Malleable	23.00
Low phosphorus, copper free	$29.00 to 30.00

Ferroalloys.—Ferromanganese prices are well maintained, though demand is far from brisk and there is some eagerness for orders on the part of both domestic and British producers. That the eagerness for business does not bring price concessions probably finds explanation in the high cost of ore. The leading domestic commercial producer is putting on an additional furnace this week and will have the output for sale. Consumers are not buying as far ahead as usual, evidently believing that if prices do not come down, there is no danger of an immediate advance. Only small tonnages of 50 per cent ferrosilicon are wanted. The general quotation of this material is $75, delivered, but adherence to this price is not very rigid. Spiegeleisen prices are unchanged, but there is so little business that they are really untested. Prices are given on page 973.

Iron and Steel Bars.—A good deal of pressure for lower prices is being exerted by buyers of steel bars and the effort, while not recognized by the leading interest, is not altogether unfruitful, since the demand generally has grown lighter in the past few weeks and there are some mills outside this district, which are having difficulty in maintaining mill schedules. Buyers claim to have quotations of 2.30c., but producers counter by saying that they are not offered orders sufficiently attractive to be tempted to go that low. There are reports that a revision of the bar card is in progress, which will set up new extras on rivet rounds. Iron bars are slow of sale and orders of the right size and character probably would bring concessions.

We quote light rails: rolled from billets, 2c. to 2.15c. base (25-lb. to 45-lb.); rolled from rail steel, 1.85c. to 1.90c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Semi-Finished Steel.—Uncertainty about finished steel prices, notably in sheets and strips, is checking business in billets, slabs and sheet bars and while there has been no easing in the price ideas of producers, considerable pressure for lower prices is being exerted by the nonintegrated mills. Weakness in pig iron and scrap, the latter having dropped about $1 a ton in the past week, is being used as an argument for lower semi-finished steel prices. There has been some decrease in orders and specifications for wire rods; products of rods are not moving without considerable sales effort and action of the larger wire producers in giving special terms of payment on woven wire fence and fence material seems to have embarrassed the smaller producers who are not financially able to make the same terms and they are holding up rod purchases. Demand for skelp is very slack and it is believed that attractive orders would bring out a lower price than 2.30c., the regular quotation. We make no change in quotations, but the market is not firm. Prices are given on page 973.

Wire Products.—Unseasonal weather has prevented the usual movement of material from second hands, and this condition finds plain reflection in orders to the mills. Buyers, particularly the jobbers, are holding back until there is a better secondary movement and mill business now represents intense sales effort. Thus far, the drive for business has brought no price shading, except that mills with customers in the territory in which southern Ohio mills have a freight advantage, are equalizing freight with those mills. It is too early to definitely appraise the effect of the recently established special terms of payment extended by the larger producers on woven wire fence and fence material, but it is known that some jobbers complain that the move attempts to set them up as bankers. Former quotation of $2.70 base, per count keg, on coated nails has pretty well disappeared, with important producers now quoting $2.60 and going as low as $2.50 to meet competition. Prices are given on page 972.

Steel Rails.—Demand for light rails continues very limited and the fact that prices have not weakened further is probably due to a realization on the part of makers of the futility of trying to make sales when there is so little demand. The coal industry still is depressed and that is the principal outlet for light rails. We make no change in prices, but they are nominal and the appearance of an attractive inquiry would probably brings concessions.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Cold-Finished Steel Bars and Shafting—Such snap as the demand recently had has largely disappeared and while there is a fair day to day business, consumers generally are buying more closely to their actual or known requirements than has been the case. The automotive industry is such a big factor in this product that its slowing down is promptly and fully felt, especially as other consuming industries have been rather sparing buyers for some time. So far as local makers are concerned, the market is 3c. base, Pittsburgh, for carloads or more and 3.25c. for less carload lots. Freight is being equalized with Chicago in competitive territory

by most makers, but only one local maker is understood to be absorbing the freight into the Chicago district proper. It is intimated that Chicago mills are not always holding to 3c. base, Chicago. Ground shafting holds at 3.40c. base, f.o.b. mill, for lots of a carload or more.

Hot-Rolled Flats.—Demand has been materially affected by the slowing down by the automotive industry and that industry being a large factor in the consumption of these lines, there naturally is some disturbance in prices. The effort is being made to maintain the market at 2.90c. and even 3c. base, and it has been fairly successful, save on wide strips and on the Ford Motor Co., business placed recently. On wide strips, 2.75c. is a fairly general price. It is asserted by some makers that the cooperage trade is not objecting to a price of 3c. Prices are given on page 972.

Cold-Rolled Strips.—Demand has decreased in keeping with the revised production schedules of a number of automobile manufacturers, and since there is not now enough business to give all makers a good operation, competition for orders again is rather keen. The market still is quotable from 4.75c. to 5c. base, Pittsburgh, but only on small lots is the higher figure now obtainable.

Track Supplies.—While makers of standard spikes still appear to have good order books, there is no doubt that shipments are running well ahead of incoming orders and there is enough competition for business to make sales above $3 base, per 100 lb. practically impossible. There is almost no market for small spikes, chiefly because the coal mine operators are not laying new track. Prices are given on page 972.

Cut Nails.—While there has been no formal price reduction, such business as has lately been done has been at a range of from $3 to $3.15 base, per 100 lb. keg, f.o.b. mill. Demand is extremely limited.

Structural Material.—This district will get the fabrication of the steel for the new steel plant of the Ford Motor Co., Detroit, which will require at least 15,000 tons and possibly more. This is the largest award placed here in a long time. Other local awards are for small tonnages and not particularly numerous, while fresh inquiries that are regarded as promising are not as numerous as recently. Labor costs are higher than a year ago and the Washington developments also are advanced as a reason for caution among investors. Plain material still is quoted here from 2.40c. to 2.50c. base for large beams, but there is no claim that the lower price would not be shaded if the orders were of the right size. Plain material prices are given on page 972.

Plates.—Independent mills generally need business and while the quoted prices still range from 2.40c. to 2.50c., base Pittsburgh, there is no doubt that even the lower price can be obtained on other than small tonnages. A clear line on actual prices is difficult in the absence of the really big inquiries. Carnegie Steel Co. has issued a new plate card which will probably be adopted by independent makers, in which a charge of $2 per ton is set up for cutting rectangular plates shorter than 5 ft. down to 3 ft. and of $5 a ton for lengths over 80 ft. to 100 ft. The new card also defines the rectangular plate price. Prices are on page 972.

Tubular Goods.—Business in pipe still is good, particularly in standard pipe, but it is evident that the mills are keeping more nearly abreast of the demands upon them than usually is the case at this time of the year, as complaints from jobbers about allotments are rare and there is very little seeking of tonnages beyond what the mills are shipping. The McCorkle Line Pipe Co. inquiry still is before the market, but is not regarded as likely to be closed in the near future. Boiler tube capacity still is too great for the demand and with none of the mills getting enough business for a full operation, prices are irregular and easy. Discounts are given on page 972.

Sheets.—The leading interest claims to be getting a very fair amount of business at the full quotations; independent mills also are getting a fairly good run of orders, but at prices in many instances about $2 a ton below the Steel Corporation prices. Buyers are not contracting for supplies to any great extent, because there is nothing in sight to suggest that supplies will not be available when wanted and there is also a lack of signs pointing to higher prices. Prices are given on page 972.

Tin Plate.—Mills in this district still are operating heavily and finding a prompt outlet for practically all of the production on contract specifications. Fresh advances in pig tin give the market additional strength, and unless the tin market falls to a much lower level by the time third quarter prices are named, it is probable there will be an advance. Some mills are without stocks of tin and have been obliged to buy at current prices. The market holds at $5.50 per base box.

Bolts, Nuts and Rivets.—Some makers find business in bolts and nuts somewhat better than it has been, but no one makes the claim that it is good or even satisfactory. Demand is spasmodic, with buyers keeping down their purchases to actual requirements. Prices are fairly firm on a base of 60 and 10 per cent off list for large machine bolts. Rivet business is fairly good, but there are more sellers than buyers and prices still show much irregularity, with quotations being shaded on attractive lots. Prices and discounts are given on page 972.

Coke and Coal.—The past week has seen some modification of the price ideas of producers and we now quote furnace grade at $4 per net ton at ovens for either spot or second quarter shipments. Even that base is not finding much support in sales, as there are a number of furnace operators who do not know whether they will keep their stacks in operation much longer, especially as the pig iron market lately has developed fresh weakness. Actually $4 is an asking price and probably would be shaded on the appearance of promising business. Foundry grade also is weak at from $4.75 to $5.50 for spot tonnages, offerings exceeding the demand. The coal market still is weak, with demand very limited and much pressure to sell. We quote mine run steam and coking coal at $1.50 to $2 per net ton at mines, gas coal at $2 to $2.25 and slack at $1 to $1.15 for steam and $1.15 to $1.40 for gas.

Old Material.—Prices have given way sharply in the past week, as the continued indifference of melters toward the market, coupled with the setting up of an embargo against one point in this district which has been one of the chief points of shipment lately, led to an effort by dealers to find out prices at which business could be done. A buyer was found for heavy melting steel at $18.50, for compressed sheets at $17, and for bundled sheet sides and ends at $15.75, about 5000 tons of the three grades being sold. This business was done yesterday. Efforts since to interest this buyer in further supplies have been unsuccessful and other mills continue out of the market, even though offered supplies at further recessions of 50c. a ton. The market is very weak, not so much because of the amount of material coming out for sale, but because there is so little consumptive demand, which in the case of the steel companies finds its most plausible explanation in the fact that the melt of pig iron in relation to purchased scrap is probably higher now than in years.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$18.00 to	$18.50
No. 1 cast, cupola size	20.00 to	20.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	21.00 to	21.50
Compressed sheet steel	16.50 to	17.00
Bundled sheets, sides and ends	15.25 to	15.75
Railroad knuckles and couplers	21.00 to	21.50
Railroad coil and leaf springs	21.00 to	21.50
Low phosphorus blooms and billet ends	22.50 to	23.00
Low phosphorus plate and other material	21.50 to	22.00
Railroad malleable	18.00 to	18.50
Steel car axles	21.00 to	21.50
Cast iron wheels	19.50 to	20.00
Rolled steel wheels	21.00 to	21.50
Machine shop turnings	14.00 to	14.50
Sheet bar crops	21.00 to	21.50
Heavy steel axle turnings	17.50 to	18.00
Short shoveling turnings	15.00 to	15.50
Heavy breakable cast	18.00 to	18.50
Stove plate	15.00 to	15.50
Cast iron borings	15.00 to	15.50
No. 1 railroad wrought	14.50 to	15.00
No. 2 railroad wrought	18.00 to	18.50

Chicago

Buying of Finished Material Confined Largely to Early Delivery

CHICAGO, March 25.—Hesitancy characterizes the attitude of the average buyer of finished steel and as a consequence current business is confined largely to material for early shipment. Actual consumption of steel, however, shows little change, and likewise production in this district continues at a high rate. New obligations of local mills still exceed shipments, and if greater efforts are now being made to press the sale of some of the heavier commodities, it is due to apprehension as to future bookings rather than to the actual condition of present commitments.

There is no doubt that both the automobile and building industries are being watched closely for developments. Automobile sales are slower than expected and production has been retarded, but much dependence is being placed on the belated arrival of milder weather. In the construction field, a heavy tonnage of fabricated steel is pending, but it is slow in being placed. Railroad buying remains the outstanding feature of the market, and the largest individual source of tonnage. The Great Northern and the Northern Pacific have placed orders for 25,000 tons and 10,000 tons of rails respectively, and the Southern Pacific has entered the market for 130,000 tons. The Soo Line has awarded a general contract to Foley Brothers, St. Paul, for a 150-pocket ore dock to be built at Ashland, Wis. Structural steel, amounting to 1300 tons, has been placed, but the reinforcing, involving 3000 tons, is still pending. The sheet market remains on a double price basis and wire products are moving slowly. Demand for semi-finished steel indicates sustained operations by the non-integrated producers, one of them having placed an order for 6000 tons of billets.

Pig Iron.—The market is quiet, but developments of the week have shown no weakening in the attitude of producers, who are holding to a minimum of $24.50, base furnace, and are making some sales at that figure. It is probable that some special analysis iron might still be picked up at 50c. concession, but it remains to be seen whether enough of this material is on the market to constitute a real factor, following the disposition of several thousand tons a week ago. As a matter of fact, the market is untested in view of the absence of large inquiries, and in the meantime with small lots bringing $24.50, base furnace, that price must be considered the ruling quotation. Pending business includes 1000 tons of malleable wanted by a Michigan melter and 600 tons of foundry and 200 tons of 8 per cent silvery inquired for by a Wisconsin consumer. In Michigan, Buffalo and Ohio competition is met in addition to the usual competition from Detroit and Toledo. Notwithstanding the fact that one Southern furnace is quoting $22.50, base Birmingham, and another is bringing in iron by barge and rail at delivered prices equivalent to those from local furnaces, small sales of Southern are still being made at $23, base Birmingham. We note a sale of 100 tons of charcoal at the market. Silvery has declined $1 a ton.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	25.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.50
Malleable, not over 2.25 sil	24.50
Basic	24.50
High phosphorus	24.50
Southern No. 2	28.51 to 29.01
Low phos., sil. 1 to 2 per cent, copper free	33.00 to 34.00
Silvery, sil. 8 per cent	37.29
Electric ferrosilicon, 14 to 16 per cent	45.42

Ferroalloys.—Sales of spiegeleisen include one of over 1000 tons and other smaller lots. On tonnage, prices range from $35 to $36, New Orleans, while carloads are quoted at $38 to $40. Ferromanganese is also more active.

We quote 80 per cent ferromanganese, $115.06, delivered; 50 per cent ferrosilicon, $75, delivered; spiegeleisen, 18 to 22 per cent, $42.56 to $48.58, delivered.

Plates.—Mills continue to run light, although more tonnage is now coming from car builders as a result of recent car orders. An inquiry for oil storage tanks for the Magnolia Petroleum Corporation at Luling, Tex., calls for 1000 tons.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Bars.—Although current demand for soft steel bars is confined largely to inquiries for early shipment and bookings of local mills still exceed shipments, the operations of the automobile industry are said to have declined an average of 15 per cent, but confidence is manifested in the quick absorption of the present unsold stocks of cars as soon as spring demand sets in. The farm implement industry shows some measure of improvement. One large implement maker, in fact, has filed specifications with the mills for April which are twice as large as those for March. Bar iron business is gradually expanding, as evidenced by the fact that one mill which has been operating at a low rate is now on a 50 per cent basis, or the best rate since last spring. Rail steel bar bookings are at a fair rate, with two important mills on a double turn basis.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. to 3c. base; hoops, 4.45c.; bands, 3.95c.

Bolts and Nuts.—Competition is keen and while the schedule of discounts based on 60 and 10 off for large machine bolts is commonly quoted, concessions are frequent. The operations of bolt and nut plants probably do not exceed 50 to 75 per cent. For discounts, which in this section are based f.o.b. Chicago, see finished iron and steel, page 972.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ⅞ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Cast Iron Pipe.—Municipal lettings of water pipe are heavy and inquiries in sight are large. At the some time, private buying continues at an encouraging rate. Prices are unchanged and pipe shops are in a comfortable position with respect to bookings. Among prospective lettings are 20,000 tons for Detroit, a large tonnage for Milwaukee, and considerable additional tonnage for Cleveland. The United States Cast Iron Pipe & Foundry Co. is the sole bidder on 1500 tons of large pipe on which Cleveland recently asked for tenders, and likewise is the only bidder on 5446 tons of 36- and 48-in. for Chicago. The National Cast Iron Pipe Co. has booked 1700 tons for Berkley, Mich., and 200 tons for Manitowoc, Wis. Barberton, Ohio, will take bids March 31 on 2350 tons of 6- to 24-in. inclusive, most of the tonnage being in the larger sizes. Rock Island, Ill., receives tenders March 31 on 320 tons of 12-in. class B.

We quote per net ton, f.o.b. Chicago as follows: Water pipe, 4-in., $60.20 to $62.20; 6-in. to 10-in., inclusive, $56.20 to $58.20; 12-in. and above, $55.70 to $56.20; class A and gas pipe, $5 extra.

Wire Products.—The special terms recently announced by the mills on woven wire fence, barbed wire and staples call for 5 per cent discount in 10 days or net in six months, as contrasted with the former 2 per cent in 10 days and net in 60 days. This step was taken to help the farmer finance his needs, but in some quarters it is believed that it has tended to unsettle the market by raising expectations of more liberal terms on other materials. In any event, business is not developing in usual volume from agricultural sections. The weather is largely to blame, but it is also recognized that if spring is late and brief, farmers may be

obliged to postpone until fall much of the work which they had contemplated to do at this season. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 972.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.65c. to 3.80c. per 100 lb.; cement coated nails, 3.10c. to 3.25c. per keg.

Sheets.—The situation is substantially unchanged, with two levels of prices and with some mills better booked than others. Black sheets appear to be weaker than blue annealed or galvanized.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 2.90c. to 3c. for No. 10 blue annealed and 4.90c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago: 4c. for blue annealed; 4.70c. for black and 5.60c. for galvanized.

Rails and Track Supplies.—The Great Northern has placed orders for 25,000 tons of rails, divided approximately as follows: 12,500 tons to Illinois Steel Co., 10,000 tons to Inland Steel Co., and 2500 tons to Bethlehem Steel Co. The Detroit United Railways has placed 1200 tons with Illinois Steel Co., and other rail orders placed with local mills include lots of 10,000 tons, 1250 tons and 800 tons respectively. Most of these orders carried track fastenings, the purchases of angle bars, spikes and bolts, aggregating 3500 tons. One of the largest rail inquiries received for some time is one from the Southern Pacific calling for 130,000 tons. Business in iron tie plates has been more active, one mill having booked orders for 7000 tons. Prices on this product range from $52 to $53 a ton.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Structural Material.—Fabricating awards show improvement, aggregating 5200 tons, and new inquiries are exceptionally heavy, amounting to over 32,000 tons. Of the latter total, however, all but 3200 tons is represented by work to be undertaken in the Pacific Coast States. One California bridge alone involves 16,000 tons. The largest pending local project, the New Palmer House, involving 17,000 tons, has suffered another delay, steel bids having been rejected and new tenders asked. There are few new inquiries in the Chicago district. Local mill prices are unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Reinforcing Bars.—The market is devoid of new developments, either as to the price or the rate of buying. Lettings are still light in comparison with the large amount of business pending and in prospect. It is hoped that when milder weather sets in building activity will be stimulated. Awards include:

University of Minnesota stadium, Minneapolis, 520 tons to Concrete Steel Co.

Lounsberry Building, Duluth, Minn., 240 tons to C. A. P. Turner Co.

Y. M. C. A. building, Green Bay, Wis., 125 tons to Concrete Engineering Co.

Viaduct, Spring Wells, Mich., 300 tons to Kalman Steel Co.

Minneapolis, municipal work, 160 tons to Kansas City Bolt & Nut Co.

Palace Clothing Co. store, Kansas City, Mo., 300 tons to Kansas City Bolt & Nut Co.

St. Mary's Academy building, Notre Dame University, South Bend, Ind., 300 tons to Joseph T. Ryerson & Son.

Illinois State road work, 150 tons to Joseph T. Ryerson & Son.

Two junior high school buildings, Appleton, Wis., 300 tons to Concrete Engineering Co.

Central high school building, Wausau, Wis., 100 tons to Concrete Engineering Co.

Pending business includes:

St. Margaret's Hospital, Hammond, Ind., 300 tons.
Minneapolis, municipal work, 117 tons.
First National Bank building, Hammond, Ind., 100 tons.
Roberts & Oake, packing plant, Chicago, 200 tons.
Indiana war memorial building, Indianapolis, 300 tons.
Jewish hospital, St. Louis, 150 tons.

Old Material—Continued weakness in the market is indicated by the fact that a local steel works last week succeeded in purchasing several thousand tons of heavy melting at $16 per gross ton delivered. In general, consumers are buying from hand to mouth and offerings of scrap are steadily growing heavier. Price reductions, averaging 50c. to $1 a ton, have been registered in most grades. Purchases by dealers to fill expiring orders for malleable have tended to give that grade some semblance of strength as compared with some of the other items. Railroad lists include the St. Paul, 2000 tons, and the Soo Line, 600 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$19.00 to $19.50
Cast iron car wheels	18.50 to 19.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	27.00 to 32.00
Forged steel car wheels	18.50 to 19.00
Railroad tires, charging box size	18.50 to 19.00
Railroad leaf springs, cut apart	19.00 to 19.50
Rails for rerolling	18.50 to 19.00
Steel rails, less than 3 ft.	19.50 to 20.00
Heavy melting steel	15.50 to 16.00
Frogs, switches and guards cut apart	16.50 to 17.00
Shoveling steel	15.00 to 15.50
Drop forge flashings	13.00 to 13.50
Hydraulic compressed sheets	13.50 to 14.00
Axle turnings	14.50 to 15.00
Steel angle bars	17.50 to 18.00
Steel knuckles and couplers	19.00 to 19.50
Coil springs	19.50 to 20.00
Low phos. punchings	17.00 to 17.50
Machine shop turnings	10.50 to 11.00
Cast borings	13.50 to 14.00
Short shoveling turnings	13.50 to 14.00
Railroad malleable	20.50 to 21.00
Agricultural malleable	19.50 to 20.00
Per Net Ton	
Iron angle and splice bars	19.00 to 19.50
Iron arch bars and transoms	18.50 to 19.00
Iron car axles	26.50 to 27.00
Steel car axles	18.50 to 19.00
No. 1 busheling	12.00 to 12.50
No. 2 busheling	9.50 to 10.00
Cut forge	14.00 to 14.50
Pipes and flues	10.00 to 10.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	14.00 to 14.50
No. 1 machinery cast	19.50 to 20.00
No. 1 railroad cast	18.50 to 19.00
No. 1 agricultural cast	18.50 to 19.00
Locomotive tires, smooth	16.50 to 17.00
Stove plate	16.00 to 16.50
Grate bars	15.00 to 15.50
Brake shoes	16.00 to 16.50

Operations in Valley Show Decrease

YOUNGSTOWN, March 25.—Though there has been a progressive decline for the past three weeks in production of semi-finished steel by Mahoning Valley plants, nevertheless rolling mill schedules have been well sustained for the most part.

This week's schedules show but 40 open-hearth furnaces on the active list, of 51 independent units, this schedule comparing with 44 last week and 48 at the beginning of the month. The decline this week is due to suspensions by the Youngstown Sheet & Tube Co.

Of 120 sheet and jobbing mills in the Valley, 99 are under power this week, as compared with 106 last week. The decline is due to suspension by the newly formed Waddell Steel Co., of the four units it started several weeks ago at the Empire plant in Niles. These mills are inactive for repairs. The Falcon Steel Co. has also cut its active sheet mill schedule from eight to six.

Iron production in the Youngstown district is increased by the addition of one blast furnace to the active list for a total of 36, of 45 stacks. With respect to capacity, though, fully 90 per cent of the district's total iron productive capacity is active. The furnace which resumed this week is a stack in the group of four of the Carnegie Steel Co. at New Castle, Pa., which was suspended for relining.

Offsetting losses in rolling mill operations are the resumption of two light bar mills by the Republic Iron & Steel Co. and its 14-16 in. merchant bar mill. The Sheet & Tube company has also placed another tube mill in action, leaving only No. 1 pipe furnace cold. Of 17 tube mills in the Valley, 16 are rolling.

Ingot production for the district averages 90 per cent. The Sheet & Tube company estimates its active ingot production at 85 per cent. and the Republic Iron & Steel Co. at 80 per cent. However, the Carnegie Steel Co., Trumbull Steel Co. and Sharon Steel Hoop Co. are operating their steel departments as close to normal as physically possible.

New York

Competition Keen in Diminishing Volume of Steel Buying—Pig Iron Dull

NEW YORK, March 25.—The pig iron market is exceedingly dull. Sales have been few and only a small tonnage is now pending. An inquiry for 600 tons of foundry iron for delivery in the third quarter to a Bloomfield, N. J., foundry is the first indication of interest in that period. Another inquiry is for 600 tons for the second quarter. At Buffalo the range is still from $21.50 to $22 No. 2 plain, and in eastern Pennsylvania $22 is the ruling price. It is confidently expected that within the next few weeks a number of blast furnaces will be blown out.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.27 to $25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.77 to 25.27
East. Pa. No. 2, sil. 1.75 to 2.25	24.27 to 24.77
Buffalo, sil. 1.75 to 2.25	26.41 to 26.91
No. 2X Virginia, sil. 2.25 to 2.75	31.44
No. 2 Virginia, sil. 1.75 to 2.25	30.44

Ferroalloys.—There is a fairly active demand for small lots of ferromanganese and frequent sales of carload lots have been made at the regular price of $107.50, seaboard. A feature of this demand is the request of consumers for immediate shipment. A statement is going the rounds that a leading domestic producer is willing to book orders for the last half at $1 per ton concession below the British price, or at $106.50. Buying of spiegeleisen, both domestic and foreign, is confined to small lots at regular quotations, the British, which is offered in limited quantities, being available at slightly lower prices than the domestic. There are no developments in either the 50 per cent ferrosilicon or the standard ferrochromium markets, specifications on contracts being normal.

Cast-Iron Pipe.—Prices continue firm, the active demand from private sources and municipalities having filled most makers up for the next three months. An opening of bids on a contract, March 26, by the Department of Water Supply, Gas and Electricity, New York, involves 2000 tons of 20-in. and 30-in. water pipe. We quote per net ton, f.o.b. New York: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Makers of soil pipe have orders for about two months ahead and report increased activity by jobbers in the New England district. Discounts are unchanged. We quote discounts of both Southern and Northern makers, f.o.b. New York, as follows: 6-in., 29½ to 30¾ per cent off list; heavy, 39½ to 40¾ per cent off list.

Warehouse Business.—Fair activity is reported in most products, but the mill situation is apparently being reflected in warehouse sales. While the volume of orders is fairly large, the tonnage is small. In some quarters it is pointed out that the present ability of the mills to make early delivery and the consideration being given to the smaller consumers' needs is drawing business to the mills that might otherwise be placed with the warehouses. According to reports, a large number of warehouses in this district have purchased European steel, chiefly bars and shapes. Although some are said to have found this material unsatisfactory, others are reported to have received lots that were thoroughly acceptable in every way. Demand for wrought iron and steel pipe is increasing and discounts are quite firm. We quote prices on page 988.

Finished Iron and Steel.—Steel buying is in diminishing volume and price competition is a little keener, particularly on plates. The Standard Oil Co. of New Jersey placed 5000 tons of heavy plates, on which there were large extras, and the base price is reported to have been low. Car companies are said to have been quoted 2.15c., Pittsburgh, on tonnage now pending and locomotive builders are also reported to be getting prices below 2.20c., Pittsburgh. For the average trade 2.25c., Pittsburgh, is now fairly common if the tonnage is of sufficient size. Shapes also show some weakness, although this is not general with all mills. Some sales have been made at 2.30c., Pittsburgh, while 2.35c. now appears to be the top of the market. On merchant steel bars quotations range from 2.30c. to 2.40c., Pittsburgh, depending on the buyer and the size of the order. Concrete reinforcing bars are easily obtainable at 2.30c., Pittsburgh, and in some instances merchant steel is to be had at the same figure. However, 2.35c. is a more common quotation and some mills are still able to get 2.40c., especially from regular trade with which service is as much of a factor as price. Structural steel work seems to be going ahead in spurts, and the past week was not so active as the week preceding. Fabricators again have been invited to bid on 20,000 tons for the Central Railroad of New Jersey bridge across Newark Bay. This project was in the market about a year ago, but work was postponed after the bids had been received. There have been no railroad inquiries or purchases of cars in the East in the past week.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.69c. to 2.74c.; plates, 2.59c. to 2.74c.; structural shapes, 2.64c. to 2.74c.; bar iron, 2.54c.

Coke.—The market is weaker and demand very slack. Distress tonnages are being offered at low prices and producers are reported preparing to curtail production. Standard foundry is quotable at $5 to $5.50 per ton and less. Standard furnace is quoted at $4 to $4.25 per ton, with distress tonnages offered as low as $3.75 per ton. By-product is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—Weakness continues in practically all grades. Heavy melting steel is particularly quiet and in consequence of the dearth of activity in this grade. Purchasing is almost entirely to fill old contracts, and little change in price has occurred. Dealers and brokers are still offering $15.50 to $16 per ton, delivered, to eastern Pennsylvania consumers and report no difficulty in securing sufficient tonnage. The greatest activity is in cast borings, borings and turnings and stove plate. Purchases of cast borings are being made at $14.50 per ton, delivered Harrisburg, and borings and turnings are quoted at $14 to $14.50 per ton, delivered eastern Pennsylvania. Stove plate is going forward to Harrisburg at $15.50 and to Phoenixville, Pa., at $15 to $15.50 per ton, so that with a New Jersey consumer with a $2.02 freight rate out of the market temporarily, the buying price New York is $12 to $13 per ton. Specification pipe is about $14.50 per ton delivered to an eastern Pennsylvania consumer. The Forty-second Street spur of the Third Avenue Elevated Railroad will be wrecked by the Albert A. Volk Co., New York, which took the contract at $600. This company is now receiving bids for the material, which includes a small tonnage of rails and about 1000 tons of wrought iron, to be sold in as large pieces as possible. Work begins at once.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.00 to $12.50
Steel rails, short lengths, or equivalent	12.75 to 13.25
Rails for rolling	17.00 to 17.50
Relaying rails, nominal	25.00 to 26.00
Steel car axles	18.00 to 19.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	16.00 to 16.50
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	15.00 to 15.50
Cast borings (clean)	10.25 to 11.25
Machine-shop turnings	10.75 to 11.25
Mixed borings and turnings	10.75 to 11.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.50 to 11.00
Stove plate	12.00 to 13.00
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	14.00 to 15.00
Cast iron car wheels	16.00 to 16.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$18.50 to $19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.50 to 18.00
No. 1 heavy cast, not cupola size	13.50 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	15.50 to 16.00

"Anti-slip pulley plating," intended largely to eliminate belt slippage, is being marketed by the Baertl Co., 97 Water Street, New York. It may be applied to pulleys of iron, steel, wood or paper without interruption to production, and is said to have a coefficient of 0.36 with leather, as against 0.18 between an iron or steel pulley and leather. The material has been marketed heretofore in Europe.

Boston

Another Round Lot of Eastern Pennsylvania Iron Sells at $21.50 Furnace Base

BOSTON, March 25.—Another round lot of eastern Pennsylvania pig iron sold the past week in this territory at $21.50 furnace base, a Massachusetts melter taking 500 tons No. 2X at $22 and an equal amount of No. 1X at $22.50 furnace, or $25.65 and $26.15, respectively, delivered. This sale, together with that recently made to the H. B. Smith Co., Westfield, Mass., leaves little doubt that $21.50 furnace eastern Pennsylvania iron can be done on round tonnages, notwithstanding the fact that some furnaces in that district are maintaining a $23 furnace base schedule. The Buffalo iron market also gives evidence of softening. Quotations on such iron are now made more often on a $21.50 furnace base than $22 as heretofore. Virginia iron prices are largely nominal due to a lack of sales, and little Alabama iron is moving in this territory. Both high and low phosphorus foreign iron is still offered at attractive delivered prices. But aside from the 1000 tons sold, previously mentioned, New England foundries during the past week took less iron than they have in many months. If there is any increase in melt in this territory, it is very slight, and foundries profess to see little encouragement in the business outlook. With the individual weekly melt restricted, with fair supplies in yards or due them, and with furnace prices unsettled, the average New England foundry is inclined to work inventories down to a minimum.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$25.65 to $27.15
East. Penn., sil. 1.75 to 2.25	25.15 to 26.65
Buffalo, sil. 2.25 to 2.75	26.91 to 27.41
Buffalo, sil. 1.75 to 2.25	26.41 to 26.91
Virginia, sil. 2.25 to 2.75	32.42 to 33.42
Virginia, sil. 1.75 to 2.25	31.92 to 32.92
Alabama, sil. 2.25 to 2.75	33.10
Alabama, sil. 1.75 to 2.25	32.60

Shapes and Plates.—Activity in the shape market the past week centered largely in small tonnages, although local fabricators are figuring on 5000 to 6000 tons for the Statler Hotel, Boston. The largest structural steel award was 750 tons for a bridge to the American Bridge Co. The Boston Bridge Works is awarded 376 tons for a Haverhill, Mass., bridge and 266 tons for a local factory addition, while the New England Structural Co. has 150 tons for a Woods Hole, Mass., job, these four contracts aggregating but 1542 tons. For a hotel, Portland, Me., 300 tons of structural steel is required, and figures will shortly be out on two Maine Central Railroad bridges and a Rutland Railroad bridge. Plates are in fair request, although most of the largest buyers have covered their requirements. Plates are still available at 2.25c., Pittsburgh base.

Soft steel bars, $3.51½ per 100 lb. base; flats, $4.40; plain and deformed concrete bars, $3.76½; small angles, channels and tees, $3.51½; structural steel, large angles and beams, $3.61½; tire steel, $4.80 to $5.15; open-hearth spring steel, $5 to $8; crucible spring steel, $12; steel bands, $4.31½ to $5.20; hoop steel, $5.80 to $6.30; cold rolled steel, $4.35 to $4.85; toe calk steel, $6.15; heavy plates, $3.61½; light plates, $3.86½; diamond pattern plates, stock sizes, $5.90; blue annealed sheets, $4.51¼; refined iron bars, $3.51½; best refined iron bars, $4.75; Wayne, $5.50; Norway rounds, $6.60; Norway squares and flats, $7.10.

Old Material.—A further curtailment in old material business was noted the past week. Certain brokers still have small unfilled Steubenville heavy melting steel orders on hand, against which they are willing to pay $13 on cars or better, but because of the frequency of rejections in that district are finding it difficult to cover. Otherwise the heavy melting steel market is virtually at a standstill. Limited buying of turnings and borings is going on at a steadily easing scale of prices. Springfield, Mass., shops have turned down several offers of $10 on cars for steel turnings the past week, but brokers have bought elsewhere at that figure. The lack of life in other materials offers little opportunity for prices to change. A small tonnage of steel chips sold by the Arsenal, Watertown, Mass., the past week fetched 41c. per 100 lb. Bids will be received until March 31 by the Commonwealth of Massachusetts for the purchase of scrap at the Chestnut Hill Pipe Yards, Beacon Street, Brighton; and at the Glenwood Pipe Yard, Medford, Mass.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $22.50
No. 2 machinery cast	20.00 to 20.50
Stove plates	15.50 to 16.00
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.00
No. 1 railroad wrought	14.00 to 14.50
No. 1 yard wrought	13.00 to 13.50
Wrought pipe (1-in. in diam., over 2 ft. long)	10.00 to 10.50
Machine shop turnings	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.25
Cast iron borings, rolling mill	10.50 to 11.00
Blast furnace borings and turnings	9.50 to 10.00
Forged scrap and bundled skeleton	9.50 to 10.00
Shafting	17.00 to 17.50
Street car axles	17.00 to 17.50
Rails for rolling	13.50 to 14.00

Buffalo

Sellers Well Supplied with Orders Are Now Firmer in Price Ideas

BUFFALO, March 25.—The pig iron market shows a little stiffer tone this week, but whether the prices will be able to withstand the battering process it is undergoing will depend largely on just how much sizable tonnage is up for quotation. Undoubtedly good tonnages have had little difficulty the past two weeks in commanding the $21.50 price, and this price or even lower may continue to apply to large lots, but indications are that melters will have to do more shopping around to get these prices. Better backlogs and a disposition not to break down the price structure any further are influencing producers to a firmer stand. At the same time, the amount of piled iron in the district may be a factor in tending to lower prices. Part of this iron already has a definite objective, but the stocks of a furnace just outside the Buffalo district, one which has a freight advantage over Buffalo furnaces, may militate against this market's firmness. One producer who has taken considerable tonnage over the past two or three weeks at less than $22 announces it is not interested in lower than $22 for standard iron and will ask $22.50 and $23 as silicon differentials. This furnace has only about 5000 tons to sell between now and July 1, though it has about 5000 to 6000 tons of high silicon, off sulphur and some malleable piled. This interest considers itself practically out of the market for second quarter iron.

Another producer which has not been very active over the past two weeks asserts lower than $22 for even round tonnages has been refused and its program for the immediate future is the same. Two of the three other producers indicate more firmness; the fifth, while ostensibly out of the market, participated in some tonnage last week at what is generally believed to have been around $21. The inquiry for this week is about 12,000 to 15,000 tons, including one from Cortland, N. Y., for 3000 tons of basic and a 2000-ton inquiry for foundry from Ohio. A 1000-ton lot, also from out of the district, figures in this total. The Gould Coupler Co.'s order of 2000 tons of basic, noted last week, was distributed to two Buffalo furnaces and the 1000-ton malleable to a third Buffalo furnace. Either $21 or $21.50 is believed to have been developed on the basic and something under $22 on the malleable. On small lots the going price seems to have been $22, with differentials disregarded in some cases. Hanna Furnace Co. blew out a furnace for repairs and placed another in blast, maintaining the same rate of production.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$22.50 to $23.00
No. 2 foundry, sil. 2.25 to 2.75	22.00 to 22.50
No. 2 plain, sil. 1.75 to 2.25	21.50 to 22.00
Basic	21.50 to 22.00
Malleable	21.50 to 22.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Structural fabricated business is holding up well, with prices fairly firm, despite the strong competition. Bids on the Liberty Bank Building, to require 5000 tons, are postponed till April 3. Many good-sized contracts are hanging fire. The steel for the New York Central order for 2000 cars placed with the Buffalo plant of the American Car & Foundry Co. will be purchased in New York, but it is understood the specialties in this contract will be purchased through local mills. General steel contracting for second quarter is light, consumers buying as they require the material. The bar price of 2.40c. is fairly firm; plate business is slow and the price subject to a good deal of variation; shape price is still around 2.40c. In semi-finished, demand for sheet bars is better than for billets. Bolts and nuts are weak, with some fancy discounts on quantity orders. In warehouse trade the usual spring demand for repair parts, boiler tubes, etc., is noticeable, with sheets moving fairly well. Reinforcing bar business shows the same steady flow of small orders. The Liberty Bank Building will require 400 or 500 tons reinforcing bars in addition to the structural steel.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Old Material.—The market is quiet, with a little more firmness. A survey of dealers' yards shows that these have been well cleaned and consumers' stock piles are reported to be greatly diminished. While the buying the past month has been of the hand-to-mouth variety, it has been heavy in the aggregate, but steady and high-paced mill operation has used up the material as it has come in. The heavy melting steel market seems to be firmer. Some mills assert they can buy tonnage at $18 and small lots can be occasionally picked up at $17, but it is known that as high as $18.75 has been paid by one mill for carloads of strictly No. 1 grade. Unfilled orders for $19.50, $20 and $20.75 are still out and $19 has been paid for heavy melting steel to ship on these. One large mill interest here is expected to be in the market about the first of April for a considerable tonnage of heavy melting. Mixed turnings and borings are somewhat off at $13.50 to $14, and machine shop turnings can be bought for $12 to $12.50. Borings and grate bars are down, but No. 1 busheling and stove plate are a little stronger. An increased demand for malleable is noted, the first in a long time. Some demand exists for No. 1 machinery cast and stove plate has been bought during the week.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$18.00 to $19.00
Low phos., 0.04 and under	21.50 to 22.00
No. 1 railroad wrought	16.00 to 17.00
Car wheels	20.00 to 20.50
Machine shop turnings	11.50 to 12.00
Cast iron borings	13.50 to 14.00
No. 1 busheling	16.00 to 17.00
Stove plate	17.00 to 17.50
Grate bars	16.50 to 17.00
Bundled sheet stampings	13.50 to 14.00
Hydraulic compressed	17.50 to 18.50
Railroad malleable	21.00 to 21.50
No. 1 machinery cast	20.00 to 20.50

Birmingham

Buying of Pig Iron Slow and Prices Weak—Pipe Companies Are Busy

BIRMINGHAM, ALA., March 24.—Southern furnace interests have not lost confidence, despite the fact that the buying has been slow lately and the quotations have weakened. Small-lot sales are being made but not in as large number as heretofore, and consumers are still seeking concessions. Sales have been made at $22.50 per ton, No. 2 foundry, in this district. Production of pig iron has not been increased and none will be noted until the demand warrants it. The greater amount of the small-lot business being received now is coming from home consumers. Shipments of iron are heavy, but one or two of the smaller companies report placing some iron on yards. The aggregate reduction for the month will probably not be equal to that of February. All cast iron pipe and fittings shops of this section report more business in sight and several of the more prominent interests are operating practically at capacity. The pressure pipe makers are from 30 to 90 days well covered on smaller sized pipe, yet with more business coming in on larger sizes. Municipalities are preparing for development and pipe makers will get business. Inquiries include a few lots of 1000 tons. The radiator makers have placed their order for 5000 tons, delivery during second quarter.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$22.50 to $23.00
Basic	22.50 to 23.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—The market for cast iron pipe, both pressure and soil pipe, is showing strength, demand is good and the quotations firm. Soil pipe and fittings makers have asserted again probabilities of another advance in price, but so far $60 is holding firm. The pressure pipe makers have not adjusted prices lately. Orders received by American Cast Iron Pipe Co. are: Seattle, Wash., 107 tons; Los Angeles, Calif., 368 tons; Magee, Miss., 315 tons; Dallas, Tex., 356 tons.

We quote class B, 4-in. water, $52 to $53; 6-in. and over, $48 to $49; class A, $5 higher; standard soil pipe, $60; heavy gage, $45.

Finished Steel.—A little better feeling is noted in the steel market though the demand for shapes, wire, nails, rods, etc., is still slow. Some stock has accumulated in this district. The Gulf States Steel Co. has but three out of six of the open-hearth furnaces at Gadsden in operation. Steel bars are still quoted at 2.60c., Birmingham.

Coke.—The coke market has taken on a little improvement, with quotations 50c. higher than for some weeks. Foundry cokes, both beehive and by-product, are bringing $5.50 to $6.50 per ton, and many foundries are calling for delivery, though all business is in small lots.

Scrap.—No change is to be reported in the scrap market and those melters who have been using No. 1 cast and stove plate continue asking for delivery on contracts and where necessary are buying in small lots.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	14.00 to 14.50
Railroad wrought	12.00 to 13.00
Steel axles	19.00 to 20.00
Iron axles	21.00 to 21.50
Steel rails	12.00 to 13.00
No. 1 cast	20.00 to 20.50
Tram car wheels	17.00 to 18.00
Car wheels	16.00 to 17.00
Stove plate	15.50 to 16.50
Machine shop turnings	7.00 to 9.00
Cast iron borings	9.00 to 10.00
Rails for rolling	16.50 to 17.00

Cincinnati

Pig Iron Orders Confined to Small Lots and Prices Are Untested

CINCINNATI, March 25.—Pig iron business continues light, one and two carload lot sales being the only activity. Hardly enough business is being done to establish a price and what could be done on tonnages is problematical. Last week's prices continue in effect, but it is noticeable that some of the furnaces asking higher than the regular market have now receded to equal figures with the lower priced sellers. In southern Ohio $23.50 is now the established market price, and in Birmingham district $23 is the regularly quoted price. Tennessee iron is quoted at $22.50, Birmingham. Silvery furnaces are taking business at $1 under the schedule. There were no sales of basic or Bessemer reported and charcoal iron also is inactive. Little inquiry is current, the largest reported being for 200 tons of foundry from Indianapolis.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.05
Ohio silvery, 8 per cent	35.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.77
Basic Northern	24.77
Malleable	25.77

Sheets.—The market is apparently marking time, and carload orders are the rule. While some business is being booked at the established prices of 3c., 3.85c. and 5c. for blue annealed, black and galvanized respectively, most of the sales are at $2 per ton below these prices, and on blue annealed, 2.85c. has been done. Formed roofing sheets are especially weak.

Structural Activity.—A number of small inquiries appeared. An apartment building at Nashville, Tenn., will require 350 tons; a bridge near Cincinnati, 470 tons, and another bridge at Cincinnati, 125 tons. Awards include 1700 tons for a warehouse for the Louisville Gas & Electric Co.; 450 tons for the Columbian office building at Columbus, Ohio, and general contract for Masonic Temple at Portsmouth, Ohio, 900 tons of steel being required. Prices quoted for fabrication are very low, and on one small job it is stated that under $80 per ton, delivered, was done.

Reinforcing Bars.—The market is fairly active, and a large number of small awards are being made. Several fair sized projects have been awarded on general contract, but inquiries for the bars have not been sent out. These include a loft building at Ninth and Sycamore Streets, Cincinnati, 600 tons, general contract to Ohio Building & Construction Co.; addition to Cincinnati Times-Star Building, 300 tons, general contract to J. & F. Harig, and the Vernon Manor Garage Co., garage building, 150 tons, to Ferro-Concrete Construction Co. Bourne-Fuller Co. have taken 100 tons for addition to the Globe Folding Box Co. The market on bars ranges from 2.10c. for rail steel bars to 2.40c. on bars rolled from new billets.

Warehouse Business.—Local jobbers report business good. This is especially true of reinforcing bars. Cold-rolled steel is also moving in fair volume. New extras on cold-rolled are being quoted. Cement coated nails are now being quoted at $3.05 per keg, a reduction of 15c. Otherwise, prices are being firmly maintained.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.50 per keg base; cement coated nails, $3.30 per keg.

Finished Materials.—Interest centered in the inquiry for approximately 800 tons of plates sent out by the Louisville & Nashville Railroad Co. This order was evidently an attractive one, for several quotations of 2.35c., Pittsburgh, were too high to take the business. Reports are current that a price equivalent to 2.25c., Pittsburgh, was made. On fire box plates it is reported that 2.20c., Pittsburgh, was quoted. A test of the market will be secured on April 3, when the Big Four Railroad will open bids on its second quarter requirements of steel, including bars, shapes, plates, iron bars, sheets, and other items. The market on plates can hardly be quoted at more than 2.35c., Pittsburgh, as it is said that this price would be quoted by practically all the larger mills. On shapes, 2.40c. appears to be the general quotation, but this price can be beaten on attractive business. Bars are pretty firmly held at 2.40c., and in the case of cold-rolled products the price situation is steady at 3c, with freight being equalized into highly competitive territory. Weakness in boiler tubes is evident, and substantial reductions below published prices are being made to secure business. Coated nails are also a weak spot, and the market is not higher than $2.50 per keg. Common wire nails are steady at $3 mill. It is reported that one manufacturer of bolts and nuts has taken some second quarter contracts at 70 and 10 off.

Coke.—The coke market is fairly active. A southern Ohio furnace contracted for 6000 tons of Kanawha furnace coke for second quarter and a local melter bought 25 cars of Wise County furnace. The Louisville & Nashville Railroad bought 500 tons of Wise County foundry. Prices are weak in Wise County field and quotations given are nominal. No change in by-product foundry coke contracts for April will be made.

Connellsville furnace, $4.15; foundry, $5; New River foundry, $10.50; Wise County furnace, $4.25; foundry, $5.25; by-product foundry, $8, Connellsville basis.

Old Material.—There is absolutely nothing being done as regards sales in the scrap market and prices are still sliding. The market is easily 50c. lower than last week and quotations are nothing more than nominal. Mills in this district are well covered and apparently cannot be interested at bargain prices.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	$15.00 to $15.50
Scrap rails for melting	14.50 to 15.00
Short rails	19.00 to 19.50
Relaying rails	29.00 to 29.50
Rails for rolling	16.50 to 17.00
Old car wheels	14.00 to 14.50
No. 1 locomotive tires	15.00 to 15.50
Railroad malleable	17.00 to 17.50
Agricultural malleable	16.00 to 16.50
Loose sheet clippings	9.50 to 10.00
Champion bundled sheets	11.50 to 12.00
Per Net Ton	
Cast iron borings	10.00 to 10.50
Machine shop turnings	9.00 to 9.50
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.50 to 16.00
Iron axles	22.00 to 22.50
No. 1 railroad wrought	11.50 to 12.00
Pipes and flues	8.50 to 9.00
No. 1 busheling	10.00 to 10.50
Mixed busheling	8.00 to 8.50
Burnt cast	11.00 to 11.50
Stove plate	11.00 to 11.50
Brake shoes	12.00 to 12.50

San Francisco

German Pig Iron Shipped from Rotterdam Sold at Low Prices on the Pacific Coast

SAN FRANCISCO, March 18.—While there have been fewer large orders during the past two weeks, there has been a satisfactory volume of business owing to the numerous and widely distributed small orders. Some of the jobbers who keep well informed as to trade conditions regard this class of business as a hopeful indication that means a continuance of activity for a considerable period beyond the immediate present. Importers say the inquiry maintains a steadiness more clearly defined than at any time for several months. Prices, too, are on a better basis and there is scarcely any talk about making concessions in asking figures as was the case three months ago. Both mills and foundries report steady operation but none is working to full capacity. The first quarter will make an excellent record and if current reports about new orders being booked for account of the second quarter are as good in other parts of the State as in this section, the second quarter will make even a better showing. The Southern California Edison Co. has announced a $27,000,000 new construction program for 1924 and more than one-third of that total will be expended for iron and steel products. Announcement is also made of a new $2,000,000 theater and hotel for San Mateo, construction to begin early in the summer.

Pig Iron.—The demand continues of fair proportions and prices are well sustained. Some of the interior foundries are buying more liberally than for several months and while much of the business is of small orders, the total tonnage is fairly large. The liberal buying of the past month has been a noteworthy feature and the inquiry continues good. Cargoes of foreign iron, aggregating close to 10,000 tons, have come to hand since the beginning of the year and nearly one-half of that quantity has arrived during March. Additional arrivals are expected soon, and the imports for this month will make a larger showing than any one month for a long period. Prices are still quoted around $33 to $34 per ton for domestic. German iron of 0.40 to 0.80 phosphorus and 0.06 to 1 per cent manganese has been quoted under $23 delivered Pacific Coast points, duty paid. It is understood that ocean freight from Rotterdam to Pacific Coast via in canal is $2.05 to $2.80.

Coke.—Buyers are still taking moderate quantities and business continues of sufficient volume to absorb arrivals, so there is no undue accumulation on sellers' hands. Over 3000 tons have come to hand during the

past two weeks and the bulk of it has already been placed. The price is firmly held at about $20, the same figure heretofore quoted. Domestic coke is selling in a moderate way.

Finished Iron and Steel.—Although business is said to be of fair proportions, there is a noticeable slowing down in some lines and some sellers say trade is quiet. This, however, does not apply to structural steel and the several lines related to building operations, practically all of which are active with satisfactory outlook. For reinforcing bars there is keen competition and some shading of prices in order to secure business is reported. Some very satisfactory orders for wire, bolts and rivets are said to have been recently booked for second quarter delivery.

Old Material.—The trade situation shows very little change from the reports of two weeks ago. Business remains quiet and buyers content themselves with small lots. There was some accumulation of supplies during the fourth quarter of last year and sellers do not look for much improvement until those stocks are nearly exhausted. If the mills and foundries continue their present activity much longer, the market for old material will naturally show betterment. How soon this will be cannot be determined at present.

St. Louis

Politics and Hope of Lower Prices Restrict Pig Iron Buying—Scrap Weak

ST. LOUIS, March 25.—The pig iron market has been very quiet during the last week, as far as the St. Louis industrial district is concerned. Melters seem well supplied with iron for immediate requirements, and there is slight disposition to buy for the future. This is due partly to uncertainty as to the political situation and the hope that prices will go lower. The market is softer. While Chicago's quotations are nominally $24.50, a sale of 500 tons by a Chicago maker at $24 is reported, and it is believed that a round tonnage could be bought at the lower figure. Southern iron is at $23, Birmingham. The Granite City maker is still at $25.50 to $26, f.o.b. furnace. That maker reports the sale of 500 tons of foundry iron to an Iowa melter for March and April shipment and 1000 tons of malleable to an Indiana melter. Word was received here of the sale of 10,000 tons of basic to an Iowa car builder by a leading Chicago interest. A southern Illinois melter wants 300 to 500 tons of foundry iron for second quarter shipment.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$26.16 to	$26.66
Northern malleable, sil. 1.75 to 2.25	26.16 to	26.66
Basic	26.16 to	26.66
Southern fdy., sil. 1.75 to 2.25 (rail)		28.17
Southern foundry, sil. 1.75 to 2.25 (rail and water)		26.28
Granite City iron, sil. 1.75 to 2.25	26.31 to	26.81

Finished Iron and Steel.—The Illinois Steel Co. got 30,000 and the Rail Joint Co., 10,000 of the 40,000 pairs of angle bars ordered by the Missouri Pacific Railroad. There is no other inquiry of size from the railroads. Jobbers and manufacturers of steel products are merely marking time pending tax legislation by Congress.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, ⅞-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagons blank, $2.50, and tapped, $2.50 off list.

Coke.—The coke market is extremely dull. A little cold weather in March brought a bit of relief to dealers. Piles in hands of producers are still high. Interest in foundry grades is slight.

Old Material.—The market for old material continues to show weakness and the whole list, with the exception of rails, is down, the decreases ranging from 50c. to $1.50 a ton. Consumers are doing a good business, but they are continuing a policy of buying only from hand to mouth. The reason they give for such policy is that they are uncertain as to the outcome of the political situation. Heavy railroad lists have also been a factor in beating down the market. New lists this week include: Chicago, Milwaukee & St. Paul, 2000 tons; Big Four Lines (bridge scrap), 500 tons; Alabama & Vicksburg, 650 tons; Monon Railroad (relaying rails), 500 tons, and Mount Vernon Car & Mfg. Co., 500 tons.

Iron rails	$17.00 to	$17.50
Rails for rolling	18.50 to	19.00
Steel rails, less than 3 ft.	19.00 to	19.50
Relaying rails, 60 lb. and under	25.00 to	26.00
Relaying rails, 70 and over	32.50 to	33.50
Cast iron car wheels	20.00 to	20.50
Heavy melting steel	16.50 to	17.00
Heavy shoveling steel	16.00 to	16.50
Frogs, switches and guards cut apart	18.00 to	18.50
Railroad springs	20.00 to	20.50
Heavy axles and tire turnings	13.00 to	13.50
Per Net Ton		
Steel angle bars	16.00 to	16.50
Steel car axles	19.00 to	19.50
Iron car axles	27.00 to	27.50
Wrought iron bars and transoms	20.50 to	21.00
No. 1 railroad wrought	14.00 to	14.50
No. 2 railroad wrought	14.50 to	15.00
Cast iron borings	10.50 to	11.00
No. 1 busheling	14.50 to	15.00
No. 1 railroad cast	17.50 to	18.00
No. 1 machinery cast	17.50 to	18.00
Railroad malleable	16.50 to	17.00
Machine shop turnings	10.00 to	10.50
Champion bundled sheets	10.00 to	10.50

Detroit Scrap Market

DETROIT, March 25.—Little interest is being shown by melters in old material, as production has been somewhat reduced in this district, due to slight slackening by producers of automobiles. Jobbing foundries are operating about 70 per cent, while stove, furnace and radiator shops are running at near capacity. Prices are the same as quoted a week ago.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	$14.50 to	$15.00
Shoveling steel	14.50 to	15.00
Borings	11.50 to	12.00
Short turnings	11.50 to	12.00
Long turnings	10.50 to	11.00
No. 1 machinery cast	17.00 to	17.50
Automobile cast	24.00 to	25.00
Hydraulic compressed	13.75 to	14.25
Stove plate	14.00 to	15.00
No. 1 busheling	11.50 to	12.00
Sheet clippings	10.50 to	11.00
Flashings	11.50 to	12.00

Canadian Scrap Market

TORONTO, ONT., March 24.—Business in the iron and steel scrap market in Toronto and Montreal districts has again reverted to a state of uncertainty. While the demand on mill account has been fairly good and orders for future and spot delivery have run into a very good total, foundry interests are buying in small tonnages for immediate requirements, with an occasional order being placed for stock purposes. Orders against contracts are appearing regularly and dealers are shipping steadily on this account. Trading between dealers is fairly active and is expected to continue to improve as the snow disappears from the scrap piles throughout the country.

Dealers' buying prices are as follows:

	Toronto	Montreal
Gross Tons		
Steel turnings	$11.00	$9.00
Machine shop turnings	10.00	8.00
Wrought pipe	9.00	11.00
Rails	14.00	13.00
No. 1 wrought scrap	12.00	13.00
Heavy melting steel	13.00	13.00
Steel axles	15.00	18.00
Axles, wrought iron	18.00	20.00
Net Tons		
Standard car wheels	15.00	15.00
Malleable scrap	15.00	15.00
Stove plate	16.00	16.00
No. 1 machinery cast	19.00	21.00

Cleveland

Ore Prices Will Probably Be Reduced—Light Demand for Finished Material

CLEVELAND, March 25.—Ore prices for 1924 have not yet been established, but it is probable that new prices will be named before the end of the week. At present it seems probable that a price reduction of 50c. will be made, although some sellers have taken a firm stand in opposing any reduction from last year's prices because there has been no reduction in mining costs. Several inquiries for round lots of ore came out during the week and considerable activity is expected as soon as prices are named.

Pig Iron.—The market continues unusually dull. Sales during the week were limited to small lots, the largest reported being 300 tons. Foundries needing iron are buying only for immediate requirements. Some foundries will carry over sufficient iron on first quarter contracts to last them to the middle of the second quarter. The slight curtailment in the automobile industry apparently has not been reflected in any falling off in the demand for shipments on contracts, which continue heavy. Prices show a weakening tendency in the Valley district, and an expected reduction in iron ore prices is perhaps having some effect on the price situation. A 50c. a ton reduction on iron ore, which now seems probable, would cut the production costs of pig iron $1 a ton. Foundry iron is now being offered by at least one Valley producer at $22, although sales were made during the week at $23, and some producers continue to hold to the latter price. Locally the market has not been tested recently, and the little business that was booked during the week was on the $24 basis, which has been the ruling price for some time. Should the Valley price settle down to $22, a $1 a ton reduction in Cleveland prices would doubtless follow. Several small lot sales of low phosphorus iron aggregating 500 tons are reported. Prices on Jackson County silvery iron and Bessemer ferrosilicon have been reduced $1 a ton.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25	24.50
Southern fdy., sil. 1.75 to 2.25	$29.00 to 29.50
Malleable	24.50
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	29.00

Ore Consumption.—Lake Superior ore consumed in February amounted to 4,782,659 gross tons, as compared with 4,687,947 tons consumed in January. Consumption during February, 1923, was 4,670,787 tons. Furnace stocks March 1 amounted to 22,231,900 tons. The amount on hand at furnaces at Lake Erie docks on the same date was 29,257,956 tons, as compared with 30,518,670 tons on March 1, 1923. Interior furnaces in the central district consumed during February 2,557,017 tons, an increase of 109,286 tons over January, and lake front furnaces consumed 1,909,966 tons, an increase of 5,072 tons. Eastern furnaces consumed during the month 183,441 tons, a decrease of 13,646 tons, and all-rail furnaces consumed 132,215 tons, a decrease of 6,020 tons as compared with the previous month.

Bolts, Nuts and Rivets.—The Ford Motor Co. during the week, purchased 28,000,000 demountable rim bolts and nuts, dividing the business among three or four manufacturers. This was one of the largest bolt and nut orders ever placed. It is stated that heretofore the Ford Co. has not purchased its rim and bolt nuts direct, but has bought them from the automobile rim manufacturers. A fair volume of business in second quarter contracts has come out following the opening of their books, and that delivery by some manufacturers and 60 and 10 per cent off list for large machine bolts or 5 per cent below the recent regular market quotations. The 60 and 5 per cent price is now confined almost entirely to small lots. On some desirable orders, even 60, 10 and 5 per cent has been quoted. Current rivet orders are fair. Some second quarter orders have been booked at the regular 2.75c. price. The market is weak on spot shipment orders, some of which are being taken at 2.65c.

Sheets.—Demand has become lighter and some of the mills are more in need of orders. The demand from the automobile industry has fallen off as some of the car builders have curtailed production and are not placing new orders. Some of the mills that have been holding to regular prices will doubtless have to meet the price situation to get business. Black sheets are now commonly quoted at 3.75c. Galvanizing sheets are being shaded to 4.90c., but blue annealed are holding fairly firm at 3c., and no shading of automobile body sheets is reported.

Reinforcing Bars.—Bids for the Hillard Road Bridge, Cleveland, requiring 740 tons of reinforcing bars, will be received April 26. The Bourne-Fuller Co. has taken 160 tons for a school and addition to a stadium in Toledo. Rail steel bars are firm at 2.40c., and soft steel bars range from 2.30c. to 2.40c.

Semi-Finished Steel.—A northern Ohio consumer purchased during the week approximately 4500 tons of sheet bars for second quarter at $42.50, Youngstown. Several producers are offering slabs and it seems probable that the $40 price on these might be shaded. Wire rods are firm. Continental semi-finished steel is being offered in this market at $28 to $29 for billets, $28.50 for slabs, $30 for sheet bars and $38 for wire rods, these prices c.i.f. seaboard.

Finished Iron and Steel.—Demand continues light. While March business should normally show considerable gain over February owing to the release of second quarter specifications, this month's business by some of the mills will be little above February and with others will show a falling off. The disposition of some buyers to withhold orders until material is needed has become more pronounced and they shop around to secure the best possible deliveries. Buyers in some cases insist on mill shipments in three or four days and they are able to get them. Very few second quarter contracts have been placed. With warehouses crowded with cars awaiting the spring demand, the automobile industry is marking time and some car manufacturers have reduced production schedules. Consequently the demand for steel from this source has fallen off and there have been a few suspensions. On the other hand, orders continue to come from some of the automobile parts manufacturers. Agricultural implement manufacturers have been placing small orders to clean up their seasonal production schedules. Generally the market lacks firmness. Plates are weaker. While 2.40c. has become the common price on plates, quotations as low as 2.30c. are reported on desirable orders. On structural material 2.40c. is being quoted for good orders. Steel bars remain firm at 2.40c. Both plate and bar mills are in need of orders. Hot-rolled strip steel and bands are weak, with a price range of from 2.75c. to 2.90c. Nails and wire are moving slowly, but prices are firm except on cement coated nails. An inquiry has come from Fort Worth, Tex., for a pipe line requiring 25,000 tons of plates, including 2000 tons of light plates. With this exception, little new inquiry has developed for specific work either in structural or other fields.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.75c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Coke.—The market continues very dull and is inclined to weakness. Few consumers are placing second quarter contracts, and the demand is limited mostly to car lots. Prices on standard Connellsville foundry coke are unchanged, being represented by a range from $5 to $6.50.

Old Material.—In the absence of more than a very limited consumer demand, prices have continued to decline, most grades being marked down 50c. to $1 a ton during the week. There is very little activity among

dealers, as they are covered on existing contracts. Heavy melting steel is now quoted at $19 in the Valley district, and while this grade is still slightly over $2 a ton higher than the minimum reached last November, prices have gotten down to a point at which dealers are talking of laying down material and some probably have already commenced to make purchases for yard stocks. The New York Central Railroad offered during the week about 2000 tons of cast iron car wheels, having a surplus above what it needed for conversion deals with car wheel foundries.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.50 to $17.00
Rails for rolling	17.00 to 17.50
Rails under 3 ft	18.00 to 18.25
Low phosphorus melting	19.00 to 19.25
Cast borings	13.25 to 13.50
Machine shop turnings	13.00 to 13.25
Mixed borings and short turnings	13.00 to 13.25
Compressed sheet steel	15.25 to 15.50
Railroad wrought	13.00 to 13.25
Railroad malleable	19.75 to 20.00
Light bundled sheet stampings	12.00 to 12.25
Steel axle turnings	15.25 to 15.50
No. 1 cast	20.00 to 20.50
No. 1 busheling	10.75 to 11.00
Drop forge flashings	10.00 to 10.50
Railroad grate bars	15.75 to 16.00
Stove plate	15.75 to 16.00
Pipes and flues	10.00 to 10.50

Philadelphia

Business Shows Falling Off, Particularly in Major Steel Products

PHILADELPHIA, March 25.—New tonnage, particularly in plates, shapes and bars, is declining in volume and prices show further weakness. The falling off in buying was noticeable two weeks ago, and in the past week has affected practically all steel companies, including the Pittsburgh and Youngstown mills, which sell in this district. Coincident with the decline in buying has come greater price competition. Plates have dropped to 2.20c., Pittsburgh, on the more desirable tonnages, with 2.25c. freely quoted on carloads or more. Structural shapes are being sold at from 2.30c. to 2.35c., Pittsburgh, with 2.25c. quotations to be had on large tonnage. Bars are also weaker, with 2.30c. quotations more common.

The Chesapeake & Ohio Railroad, which recently inquired for 5600 cars, including 3000 hopper-bottom gondolas, has advised steel companies that it will buy the steel for the car builders. It asks for quotations on 25,000 tons of plates, shapes and bars for 2000 cars, but if 3000 are built, 37,500 tons will be required.

The American Bridge Co. was low bidder on the suspended structure of the Philadelphia-Camden bridge and has been awarded the contract by the Delaware River Bridge Commission, the steel totaling 18,650 tons. The American Bridge Co.'s bid was $2,888,000. There were only two other bidders, the McClintic-Marshall Co., which bid $2,918,610, and the Bethlehem Steel Co., whose bid was $3,394,241. The Delaware River Bridge Commission will soon take bids on the steel for the approaches.

Ferroalloys.—Reports of price concessions on ferromanganese are denied by sellers. These reports have persisted for the past few weeks. Quotations are still at $107.50, seaboard or furnace, for both imported and domestic alloy.

Billets.—There is not enough business to test prices of billets, which are quoted at $40, Pittsburgh, for rerolling quality and at $45 for forging quality.

Pig Iron.—Pig iron business has reached almost the vanishing point, consisting almost wholly of carload lots. There have been a few inquiries for third quarter, but furnaces are disinclined to quote for that delivery. Prices are weak, but have changed very little, if any, because there has not been enough important inquiry to tempt furnaces to make concessions. Foundry iron is quoted at $22.50 to $23, furnace, for the base grade, No. 2 plain, with some furnaces willing to go to $22 for desirable orders. One important eastern Pennsylvania interest, which has not been an anxious seller for several weeks, is again soliciting business. The Replogle Steel Co. is having trouble with its furnace at Wharton, N. J., due to a hot spot, and will probably put it out of blast soon.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.63 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.13 to 24.63
East. Pa. No. 1X	24.63 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	30.17 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.67 to 31.67
Basic delivery eastern Pa.	21.50 to 22.50
Gray forge	22.00 to 23.00
Malleable	23.75 to 24.25
Standard low phos. (f.o.b. furnace)	27.00 to 27.50
Copper bearing low phos. (f.o.b. furnace)	27.00 to 28.00

Plates.—Small buyers of plates are contesting for the same prices recently quoted on important tonnage and to some degree the buyers are winning, due to the need of Eastern mills for tonnage. Orders for less than 100 tons have been placed at 2.20c. and 2.25c., Pittsburgh, with 2.30c. now the top of the market. Special buyers, such as car builders, shipyards and oil companies, have been given concessions which have been the forerunners of the prices now available to the smaller buyers. The pending plate tonnage of the Chesapeake & Ohio Railroad is expected to bring out still lower quotations. Eastern mills show no gain in operations, the average being around 50 per cent in the finishing departments.

Structural Material.—Aside from the 18,650 tons of material for the Philadelphia-Camden bridge, awarded to the American Bridge Co., this district is devoid of important construction activities involving steel. Several apartment houses, on which steel bids have been tendered, have not gone ahead due to financing delays. Plain material prices show no change, but are weak. Sales have been made at 2.30c. and 2.35c., Pittsburgh, within the past week and 2.25c., Pittsburgh, has been quoted on one important tonnage.

Bars.—Several bar mills have found it necessary to meet 2.30c. quotations on merchant steel or lose business. This price, therefore, has become more common, with a good deal of current business being taken at 2.35c., Pittsburgh. Consumers who signed up first quarter contracts at 2.40c. are slow in specifying. Bar iron is now quoted by Eastern mills at 2.20c. and 2.25c., Pittsburgh.

Sheets.—The volume of sheet buying has shown considerable recession. Prices are somewhat irregular, but not changed from those in effect in recent weeks. Some mills are naming prices about $2 a ton lower than the quotations of the American Sheet & Tin Plate Co.

Warehouse Business.—Local warehouses have made no changes in prices and are quoting for local delivery as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, ¼ in. and heavier, 3.75c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—An eastern Pennsylvania steel company bought a large tonnage of heavy melting steel on Monday at $16.50, delivered, and also bought a tonnage of blast furnace borings and turnings at $15. Two other mills are offering $16.50 for steel scrap. The market is weak and prices on nearly all grades have shown a slight decline during the past week. Scrap is still in good supply, but some yard dealers are less inclined to sell at current prices and local brokers predict that the end of the decline in prices is not far off unless there

should be a marked falling off in bookings of finished steel orders.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel		$16.50
Scrap rails		16.50
Stee. rails for rolling	$19.00 to	20.00
No. 1 low phos., heavy 0.04 and under	21.50 to	22.50
Couplers and knuckles	21.00 to	21.50
Cast-iron car wheels	18.50 to	19.00
Rolled steel wheels	21.00 to	21.50
No. 1 railroad wrought	19.00 to	19.50
No. 1 yard wrought	17.00 to	17.50
No. 1 forge fire	14.50 to	15.00
Bundled sheets (for steel works)	14.50 to	15.00
Mixed borings and turnings (for blast furnace use)	14.50 to	15.00
Machine shop turnings (for steel works use)	14.50 to	15.00
Machine shop turnings (for rolling mill use)	14.50 to	15.00
Heavy axle turnings (or equivalent)	15.50 to	16.00
Cast borings (for steel works and rolling mills)		15.00
Cast borings (for chemical plants)	17.00 to	18.00
No. 1 cast	18.50 to	19.50
Heavy breakable cast (for steel plants		16.50
Railroad grate bars		16.50
Stove plate (for steel plant use)		16.50
Railroad malleable	17.50 to	18.00
Wrought iron and soft steel pipes and tubes (new specifications)		15.00
Shafting	21.00 to	22.00
Steel axles	20.00 to	21.00

Annual Convention and Banquet of National Association of Waste Material Dealers

The eleventh annual meeting and banquet of the National Association of Waste Material Dealers was held March 19, at the Hotel Astor, New York. Harry R. De Groat, president, was reelected for the ensuing year. Considerable interest centered on President De Groat's suggestion that the by-laws of the association be changed to call for semi-annual meetings instead of quarterly meetings as at present. This proposal will be discussed at the June meeting.

"I am happy to say that our hardest years seem to be behind us," said President De Groat in his annual report. "Your association is now being recognized as an authority by the Government and big manufacturing interests. Large metropolitan banking houses confer with us on the subject of credits. Government officials frequently ask for opinions and are guided by our recommendations. Railroads and steamship lines are anxious to cooperate on transportation problems."

At the annual banquet, which was well attended by members of the association and their guests, Senator James A. Watson of Indiana spoke and Capt. Irving O'Hay provided considerable humor in a recital of his experiences as a soldier of fortune.

In addition to Harry R. De Groat, president, Egmont Frankel was elected first vice-president, Henry Lissberger, second vice-president, and G. H. Rady, third vice-president. Charles M. Haskins is permanent secretary and treasurer. E. H. Silberman, C. L. Hils and D. A. Singer were elected directors for one year and the following, directors for two years: Louis Birkenstein, James Rosenberg, Henry Lissberger, Ivan Reitler, John A. Murphy, Clarence B. White, H. H. Cummings, George B. Smitheman, Herman Muehlstein, G. H. Rady, Alex Luria, Robert Johnston, Jr., S. C. Weber, Edward Seitzinger and Henry Levitt.

Scrap Declines at Youngstown

YOUNGSTOWN, March 25.—Heavy melting scrap is quotable in the Mahoning Valley at $18.50 to $19, to consuming interests, states the leading selling interest. The price tendency is downward, and a 50c. reduction by the end of this week is predicted.

There is very little activity in the scrap market, states this company, and few inquiries. Dealers are buying cautiously by reason of the declining market and the instability of demand.

In this district, only an order of considerable dimensions would command a price as low as $18, and dealers would first cover on the tonnage before agreeing to supply the material.

Buyers at Youngstown Not So Insistent Upon Deliveries

YOUNGSTOWN, March 25.—While there is not the urgency on the part of steel buyers for deliveries that prevailed earlier in the year, and though business shows some declining tendencies, Valley makers are by no means alarmed over the situation.

Even at the expense of price concessions, some of the smaller, non-integrated sheet rollers are having difficulty in maintaining full operations. One such interest in the district has already made a moderate curtailment, and other suspensions are forecast.

Valley interests manufacturing steel products entering into building construction are receiving considerable tonnage from such sources, involving, of course, the lighter steel products.

Last month the Trumbull Steel Co., manufacturing tin plate, special sheets and strips, shipped 34,000 tons of finished steel products. It is expected March shipments will exceed those of February.

Makers of merchant steel pipe report that jobbers' stocks have been built up to a considerable degree the past few months. While demand is increasing, the fact that stocks have been well replenished is expected to prevent any unusual demands on the mills.

There has been decline in the past few weeks in specifications of semi-finished steel.

Steel plates have declined to 2.40c., which is also the nominal quotation on merchant bars.

American Blast Furnaces Abandoned in 1923

According to compilations of the American Iron and Steel Institute, 14 blast furnaces using mineral fuel and 4 using charcoal were abandoned or dismantled in 1923. The following table gives the names of the owning companies and the location of the furnaces as well as their annual capacity and when they were built:

Name of Company	Location of Furnace	No. of Stacks	Annual Capacity Gross Tons	When Built
Allentown Iron Mfg. Co.	Allentown, Pa.	2	3,000	No. 1-1909 No. 2-1910
Bethlehem Steel Co. (Colebrook)	North Lebanon, Pa.	2	95,000	Fce. C. 1881 Fce. D. 1882
Bethlehem Steel Co.	Johnstown, Pa.	1*	154,000	1853-54
Boyd & Caplan (Keystone Fur.)	Island Pk. Easton, Pa.	1	36,000	1876
Carnegie Steel Co.	Zanesville, Ohio	1	50,000	1870-71
East Penn Fdy. Co. (Macungie Fce.)	Macungie, Pa.	1	30,000	1874
First Nat. Bank of Chattanooga	Rome, Ga.	1†	30,000	1890-91
Glasgow Iron Co. (Anvil Fce.)	Pottstown, Pa.	1	50,000	1867
Jones, Harry R. (Muirkirk Fce.)	Muirkirk, Md.	1	6,000	1847
Juniata Furnace & Foundry Co.	Newport, Pa.	1‡	30,000	1871
Marting Iron & Steel Co.	Culberton, Ohio	1**	50,000	1889-90
Pacific Coast Steel Co. (Oswego Fce.)	Oswego, Ore.	1	15,000	1888
Rock Run Iron Co. (Blue Ridge Fce.)	Tallapoosa, Ga.	1	12,000	1888-89
Shenango Furnace Co. (No. 4)	Sharpsville, Pa.	1	90,000	1872
Union Furnace Co.	Ironton, Ohio	1	54,000	1873-74
Wheeling Steel Corpn. (Belmont Fce.)	Wheeling, W. Va.	1	75,000	1874
Total		18	780,000	

*Furnace C formerly No. 3.
**Lawrence furnace.
†Silver Creek furnace.
‡Marshall furnace.

The two Allentown, the Muirkirk furnace in Maryland, and the Blue Ridge furnace in Georgia were charcoal furnaces.

The Leonard & Baker Stove Co., Taunton, Mass., is installing a 96-in. cupola, the largest ever operated by a Massachusetts maker of stoves. The Gurney Heater Mfg. Co., Boston, is installing a second cupola in its Framingham, Mass., plant. So far this month, the company has melted an average of 70 tons of iron per day. The new cupola will double the plant's capacity.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.40c. to 2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.40c. to 2.50c.
Sheet piling .....2.55c. to 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....2.90c. to 3.00c.
Bands, base, per lb.....2.90c. to 3.00c.
Strips, base, per lb.....2.90c. to 3.00c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars and shafting, l.c.c., per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4 75c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....4.75c. to 5.00c.

Wire Products

(To jobbers in car lots)

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Galvanized wire No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100 lb..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg.....$2.50 to 2.60
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 5 to 60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads,
60 and 5 to 60 and 10 per cent off list
Carriage bolts, ¾ x 6 in.:
Smaller and shorter, rolled threads,
60 and 5 to 60 and 10 per cent off list
Carriage bolts, cut threads, all sizes,
50, 10 and 5 to 50, 10 and 10 per cent off list
Lag bolts ..... 65 and 5 to 65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads..50 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 5 to 50 and 10 per cent off list
Larger and longer sizes,
50 and 5 to 50 and 10 per cent off list
Hot pressed squares or hex. nuts, blank.4.25c. to 4.50c. off list
Hot pressed nuts, tapped.....4.25c. to 4.50c. off list
C.p.c. and t. square or hex. nuts, blank.....4c. off list
C.p.c. and t square or hex. nuts, tapped.....4c. off list
Semi-finished hex. nuts:
⅝ in. and smaller, U. S. S.....80 and 5 per cent off list
⅝ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Bolt ends with cold pressed nuts.....50 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	Per 1000 U. S. S.		Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.25	$4.25	⅞-in.	$13.25	$13.50
⅜-in.	4.90	4.90	1-in.	16.25	16.50
½-in.	5.90	6.25	1¼-in.	22.50	23.00
⅝-in.	7.50	8.50	1½-in.	34.00	34.00
¾-in.	9.75	10.00	1¾-in.	53.00	55.00

Larger sizes—Prices on application.

Cap and Set Screws

Milled hex. head cap screws.....75, 10 and 5 per cent off list
Milled standard set screws, case hardened
75, 10 and 5 per cent off list
Milled headless set screws, cut thread
75, 10 and 5 per cent off list
Upset hex. head cap screws, U. S. S. thread
80, 10 and 10 per cent off list
Upset hex. head cap screws, S. A. E. thread
80, 10 and 10 per cent off list
Milled studs.....65 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.75
Small rivets .....70 and 10 per cent off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....	$3.00
Spikes, ½ in., ⅝ in. and ¾ in., per 100 lb.....	3.25 to 3.50
Spikes, ⅞ in.....	3.25 to 3.50
Spikes, boat and barge, base, per 100 lb.....	3.25 to 3.50
Track bolts, ¾ in. and larger, base, per 100 lb..	4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb..	4.50 to 5.00
Tie plates, per 100 lb.....	2.60
Angle bars, base, per 100 lb.....	2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	⅛ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅝ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled

3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼-in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base $11.00	20-lb. coating I. C.....$14.90
8-lb. coating I. C..... 11.30	25-lb. coating I. C..... 16.20
12-lb. coating I. C..... 12.70	30-lb. coating I. C..... 17.35
15-lb. coating I. C..... 13.95	35-lb. coating I. C..... 18.35
	40-lb. coating I. C..... 19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.90c. to 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No .28 (base), per lb.....4.90c. to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$107.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	107.50
Ferrosilicon, 50 per cent, delivered	75.00
Ferrosilicon, 75 per cent	140.00
Ferrotungsten, per lb. contained metal	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	10.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent, $38.00 to $40.00
Spiegeleisen, domestic, 16 to 19 per cent, 37.00 to 38.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50.
Silvery iron, 5 per cent, $29.00; 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$19.00 to $22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00 to $23.50

Per 1000 f.o.b. works:

Fire Clay	High Duty	Modern Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton		6.00 to 7.00
Silica Brick:		
Pennsylvania		$40.00 to 42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		47.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	40.00
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.30c.
Skelp, sheared, per lb.	2.30c.
Skelp, universal, per ton	2.30c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2c. to 2.15c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.00
Spikes, ½-in. and smaller, base, per 100 lb.	3.25 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rail, steel reinforcing, base, per lb.	2.10c. to 2.15c.
Cold finished steel bars, base, Chicago, per lb.	3c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.00 to $3.15

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	$5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43	*Pacific Coast	$1.15
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735	*Pac. Coast, ship plates	1.20
Baltimore, domestic	0.31	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705	Birmingham	0.55
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60	Memphis	0.56
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735	Jacksonville, all rail	0.70
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705	Jacksonville, rail and water	0.415
Boston, domestic	0.365	Chicago	0.34	*Denver	1.15	New Orleans	0.67
Boston, export	0.255			†Denver (pipe)	1.17		

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Awards About 47,000 Tons and Fresh Inquiries 60,500 Tons

Including 18,650 tons for the Philadelphia-Camden bridge and 15,000 tons for the steel plant for the Ford Motor Co., bookings of the week called for 46,800 tons, while fresh projects, including a revival of the Central Railroad of New Jersey bridge, totaled 60,550 tons. Chief items among the awards are:

Loft building, West Thirtieth Street, New York, 800 tons, to Hinkle Iron Works.

Consolidated Brick Co., Horseheads, N. Y., 400 tons, to Bethlehem Steel Co.

Lock Insulator Co., Baltimore, Md., 125 tons, to Bethlehem Steel Co.

Pan-American Petroleum & Transport Co., oil tank, 275 tons, to Chicago Bridge & Iron Works.

Tennessee Copper & Chemical Co., building near Cincinnati, 600 tons, to Fort Pitt Bridge Works.

Pennsylvania Railroad, bridge, 150 tons, to American Bridge Co.

Philadelphia & Reading Railroad, bridge, 125 tons, to McClintic-Marshall Co.

Long Island Railroad, bridge, 175 tons, to unnamed fabricator.

Bridge, Hancock-Sullivan, Me., 750 tons, to American Bridge Co.

Gillette Safety Razor, Co., South Boston, plant addition, 266 tons, to Boston Bridge Works.

Government laboratory, Woods Hole, Mass., 150 tons, to New England Structural Co.

Bridge, Haverhill, Mass., 376 tons, to Boston Bridge Works.

S. Reid Holland, Wilmington, Cal., 2 55,000-bbl. tanks, 424 tons, to Western Pipe & Steel Co.

Castile Mining Co., Ramsey, Mich., hoisting engine house, Eureka mine, 140 tons, to Worden-Allen Co.

Medico-Dental building, San Francisco, 1743 tons, to Moore Shipbuilding Co.

Minneapolis, St. Paul & Sault Ste.-Marie Railway Co., miscellaneous structural steel for reinforced concrete ore dock, Ashland, Wis., 1164 tons, to American Bridge Co., plate work, 150 tons, to Minneapolis Steel & Machinery Co.

University of South Dakota, Vermillion, S. D., administration building, 125 tons, to Paxton Vierling Iron Works.

Highway bridge across Red River at Pembina, N. D., 726 tons, to Lakeside Bridge Co.

Two highway bridges for Snohomish County, Wash., 348 tons, to American Bridge Co.

Eureka Road, grade separation, Wayne County, Mich., Road Commissioners, 100 tons, to McClintic-Marshall Co.

St. Joseph Structural Steel Co., St. Joseph, Mo., 125 tons of beams for highway spans, fabrication awarded to another company.

Spaulding Fibre Co., North Tonawanda, N. Y., factory building, 450 tons, to R. S. McMannus Steel Construction Co.

American Radiator Company, Buffalo, N. Y., wings on office building, 130 tons, to R. S. McMannus Steel Construction Co.

Columbian office building, Columbus, Ohio, 450 tons, to Fort Pitt Bridge Works.

Louisville Gas & Electric Co., Louisville, Ky., warehouse, 1700 tons, to Louisville Bridge & Iron Co.

Masonic Temple, Portsmouth, Ohio, 900 tons, general contract tentatively awarded to H. R. Blagg Co., Dayton, Ohio.

United States Engineers' Office, Louisville, Ky., structural steel for lock No. 46, Ohio River, 140 tons, to Lakeside Bridge & Steel Co., Milwaukee.

Delaware River Bridge Commission, Philadelphia, suspended structure for Philadelphia-Camden bridge (contract No. 14), 18,650 tons, to American Bridge Co. on its bid of $2,888,000.

Standard Oil Co., Wood River, Ill., miscellaneous small tanks, 250 tons, to Chicago Bridge & Iron Works.

Museum of Art extension, Toledo, Ohio, 350 tons, to American Bridge Co.

Ford Motor Co., steel plant building, about 15,000 tons, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Namm department store, Brooklyn, an addition, 800 tons, may be built of reinforced concrete.

New York Central Railroad, bridge, 250 tons.

Manufacturing building, Elizabeth, N. J., Arny Construction Co., general contractor, 600 tons.

Manufacturing building, Woonsocket, R. I., 500 tons.

Standard Oil Co., oil tanks to be erected in Louisiana, 1000 tons.

City of Charleston, S. C., pier shed, 600 tons.

United Gas Improvement Co., job at Syracuse, N. Y., 100 tons.

Power plant, Morris Plains, N. J., 650 tons.

Central Railroad of New Jersey, bridge across Newark Bay, 20,000 tons, bids received about a year ago and rejected.

Hotel, Portland, Me., 300 tons.

Bridge, Crockett, Cal., 16,000 tons.

Bridge, Portland, Ore., 5000 tons.

New Republic Bank Building, Dallas, Tex., 2000 tons.

Los Angeles, harbor project, 3600 tons.

Southern California Telephone Co., building, Los Angeles, 2000 tons.

Congress Hotel, Chicago, remodeling work, 200 tons.

Magnolia Petroleum Corporation, Luling, Tex., tanks, 1000 tons.

Memorial apartments, Nashville, Tenn., 350 tons, bids close March 26.

Highway bridge, Hamilton Co., Ohio, 470 tons, bids close April 18.

City of Cincinnati, bridge, 125 tons, bids close March 31.

The McKinney Steel Co., Cleveland, addition to slag handling plant, 110 tons to McClintic-Marshall Co.

Euclid Oliver Hotel, Cleveland, 1200 tons.

Continental Gin Co., Birmingham, factory buildings, 600 tons.

Belmont Avenue viaduct, Youngstown, 900 tons, bids close March 27.

Three viaducts and a foot bridge for Buffalo, 2200 tons, bids close March 27.

RAILROAD EQUIPMENT BUYING

Included Are 31 Locomotives and 1100 Underframes—Inquiries for 570 Cars

Railroad equipment purchases for the week include 31 locomotives and 1100 steel underframes. Inquiries covered 570 freight cars.

Freight cars in need of repair on March 1 totaled 168,782, or 7½ per cent, according to the car service division of the American Railway Association. This was an increase of 3887 compared with the number on Feb. 15. Cars in need of heavy repair on March 1 totaled 119,505. The railroads on March 1 had 45,074 freight cars on order, or 19,684 cars more than on Feb. 1. During February, 11,537 freight cars were placed in service, making a total of 27,729 installed during the first two months this year.

In locomotives the railroads had on order 457 compared with 439 on Feb. 1. Locomotives installed in service in February totaled 214, making a total of 485 for January and February. Class One railroads had 11,304 locomotives in need of repair, or 17.5 per cent, a decrease of 479 compared with the number on Feb. 15.

The Philadelphia & Reading Railroad has placed an order with the Baldwin Locomotive Works for 5 additional locomotives.

The Maine Central placed 8 locomotives with the American Locomotive Co.

The Virginian awarded 12 electric locomotives to the American Locomotive Co.

The El Paso & Southwestern has placed 6 Mountain type locomotives with the American Locomotive Co.

The Western Fruit Express has placed 1000 steel underframes with the Western Steel Car & Foundry Co.

The Fruit Growers Express has placed 100 steel underframes with the Cambria plant of the Bethlehem Steel Corporation.

The Chesapeake & Ohio is inquiring for 15 express cars and 4 dining cars.

The El Paso & Southwestern is inquiring for 1 dining car and 3 buffet baggage cars.

The Florida East Coast is inquiring for 200 box, 250 rock cars, 100 ballast cars, 20 caboose cars and 1 dining car.

The Santa Fe has ordered 6 business cars from the Pullman Co.

The International & Great Northern has placed 3 coaches, 2 chair, 1 baggage mail and 4 baggage cars with the American Car & Foundry Co.

The Richmond, Fredericksburg & Potomac has ordered 15 ballast cars from the Rodger Ballast Car Co.

The Chicago & Northwestern has placed 1000 miscellaneous car parts, involving 1000 tons of steel, with the Ryan Car Co.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
March	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
19.....	14.00	13.50	54.62½	9.10	9.00	6.75	6.40
20.....	13.87½	13.50	57.00	9.00	8.85	6.80	6.45
21.....	13.75	13.37½	55.00	9.00	8.85	6.75	6.40
22.....	13.87½	13.37½	....	9.00	8.85	6.75	6.40
24.....	13.87½	13.37½	53.25	9.00	8.85	6.72½	6.37½
25.....	13.87½	13.50	52.50	9.00	8.85	6.72½	6.37½

New York

NEW YORK, March 25.

Violent fluctuations in the price of tin in the London market have more or less unsettled other non-ferrous markets both there and here. The copper market is quiet and a little lower. The speculative tin market has more or less collapsed, with rapidly receding prices. Lead is in better supply and lower. The zinc market is quiet but fairly firm at slightly lower levels.

Copper.—There were fairly liberal inquiries for electrolytic copper before the market the latter part of last week, but the decline in the London market yesterday, which was unsettled by conditions in the tin market, seems to have scared off buyers here. A sale of 3,000,000 lb. is, however, reported yesterday for domestic consumption at an understood price close to 13.75c., delivered. Aside from this, the market is exceedingly dull and inactive, with the minimum price of producers generally acknowledged at 13.75c., delivered, though small amounts are available from second hands at 13.62½c., delivered. Curtailment of production both by domestic producers and by South American to the extent of about 11,000,000 lb. per month for the former, and 1,000,000 lb. per month for the latter, seems assured. A fair business is being done for export. The tone of the market is not generally considered weak and the statistical position is pointed to as strong. Specifications on contract are heavy, indicating full consumption.

Tin.—The course of the market in the last 10 days has been checkered in the extreme. For the week ended March 21 sales estimated at 1200 to 1500 tons are reported, the bulk of it done between dealers. The violent break in the London market of March 18 frightened consumers who have regarded the market as manipulated against them; the result has been that only a few have made purchases. On March 20 and 21 the London market advanced again by £10 and £6 per ton, respectively. This caused little impression here except that two large dealers rid themselves of considerable tin on this advance. Early on March 20 the market was strong in the morning with an active demand apparent but, on the second call on the New York Metal Exchange, one dealer sold 100 tons and unsettled the market. On the following day under similar circumstances the market became depressed by offerings of another dealer and by the close it became demoralized. This situation continued on Saturday. These conditions and a heavy pressure to sell resulted in another sensational decline of £18 per ton in London yesterday. In this market a fair business amounting to about 300 tons was, however, done, consumers being buyers. Today the market has been fairly quiet, with spot Straits tin quoted at 52.50c., but largely nominal, and with metal in steamers just arrived offered at dock at 50.75c. General opinion in the market is not bullish and the question is quite frequently asked whether the upward trend has not run its full course, with the usual reaction in store. A feature of the market is the scarcity of spot tin which is practically impossible to obtain at any price. Quotations in London today were about the same as yesterday, with spot standard quoted at £261, future standard at £261 5s. and spot Straits at £263 5s. per ton. Arrivals thus far this month have been 1150 tons, with 10,785 tons reported afloat.

Lead.—The market is decidedly easier, with prompt metal obtainable at 9c., New York, but not in large quantities. There is a possibility that this could even be slightly shaded. Prices at St. Louis in the outside market are 8.80c. to 8.90c., for early delivery. The leading interest continues to maintain its contract price at 9c., New York, so that for the first time in many weeks the two markets are on a parity. The principal cause for the easier market and considerably lower prices as compared with several weeks ago is due to consumers remaining out of the market for four to six weeks, together with some increase in production.

Zinc.—Lower quotations in London have resulted in easier prices here, the market during the week having fallen about 10 points, so that quotations today for prime Western range from 6.35c. to 6.40c., St. Louis, or 6.70c. to 6.75c., New York. Sales of several hundred tons were made yesterday at 6.37½c., and there was some inquiry in the market today, one of which involves 300 tons.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside market both shot and ingot nickel are quoted at 28c. to 42c. per lb.

Antimony.—The metal both here and in China is closely held and supplies are scarce. Wholesale lots for early delivery are quoted and sold at 12c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 28c. per lb., duty paid, delivered by importers who are able to obtain it from their foreign principals.

Old Metals.—The market is sluggish and values erratic. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.25
Copper, heavy and wire	12.25
Copper, light and bottoms	11.00
Heavy machine composition	10.75
Brass, heavy	8.75
Brass, light	7.25
No. 1 red brass or composition turnings	9.75
No. 1 yellow rod brass turnings	8.25
Lead, heavy	7.75
Lead, tea	6.50
Zinc	4.75
Cast aluminum	18.50
Sheet aluminum	18.50

Chicago

MARCH 25.—The long expected reaction in tin and lead prices, which held a purely speculative position, has eventuated, tin having dropped 3.50c. and lead six tenths of a cent. The tin market presents an unusual situation in that future material can be bought at 2.50c. less than spot metal, or at approximately 52c. Zinc has declined slightly as the result of offerings by brokers, producers' prices remaining unchanged. Copper has also dropped a few points. Among the old metals grades of lead and tin have declined. We quote in carload lots: Lake copper, 14c.; tin, 54.50c.; lead, 8.90c.; spelter, 6.45c.; antimony, 13.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 10c.; red brass, 9.25c.; yellow brass, 7.50c.; lead pipe, 6.75c.; zinc, 4c.; pewter, No. 1, 30c.; tin foil, 35c.; block tin, 43c.; all buying prices for less than carload lots.

The Brylgon plant of the American Manganese Steel Co., New Castle, Del., has been acquired at a public sale by Seldon S. Deemer, local resident, formerly president Deemer Steel Casting Co., for $29,500. It is reported that the new owner plans the organization of a new company to take over and occupy the mill, which has been idle for several years, remodeling and installing equipment. Since disposing of his interest in the Deemer Steel Casting Co., Mr. Deemer has practically been retired from active business.

New transformer standards have been published in pamphlet form by the Electric Power Club. Preferred ratings and system voltages and the adoption of outdoor construction as standard are among the important new rules. The pamphlet is the third edition of the standards and may be obtained from manufacturers of power and distribution transformers, or from the Electric Power Club, B. F. Keith Building, Cleveland.

PERSONAL

W. D. Moore, a prominent figure in cast iron pipe manufacturing circles, has been made president of the American Cast Iron Pipe Co., Birmingham, Ala., succeeding John J. Eagan, Atlanta, Ga., resigned. Mr. Moore has been with the Birmingham plant for 15 years, having gone there from Galion, Ohio, in 1907. For a brief time he was connected with the Tennessee Coal, Iron & Railroad Co. at Ensley. He went with the Cast Iron Pipe company in 1908 and worked his way through every department of the company, becoming vice-president and works manager in 1922. He is the inventor of a centrifugal method of making pipe. John J. Eagan has been connected with the American Cast Iron Pipe Co. since its organization. For several months past he has been seriously ill, and while his condition is improving, his forced absence from business affairs, prompted him to resign. He will continue his connection with the company as advisory director. Mr. Eagan installed the plan of industrial government at Acipco, which is based on practical application of the golden rule to industry. Other officers of the company are Paul A. Ivy, vice-president and general sales manager; C. D. Barr, vice-president and director of purchases; C. O. Hodges, assistant treasurer.

Edward Cairns has resigned as secretary-treasurer of the V & O Press Co., Hudson, N. Y. He joined the organization shortly after leaving Cornell University and has been connected with it for 18 years, most of that time as secretary-treasurer and sales manager. After an extended vacation, Mr. Cairns will devote himself to interests in New York, though he continues as a director of the V & O Press Co.

James Bowron, chairman Gulf States Steel Co., is making a tour of South American countries. He is expected to return to Birmingham, Ala., in May.

E. D. Allmendinger, manager of the foreign department of the Black & Decker Mfg. Co., Towson, Md., manufacturer of portable electric tools, sailed for England on March 15. He will remain abroad for several weeks in the interest of the company.

Harry G. Acres, Niagara Falls, Ont., chief hydraulic engineer of the Chippawa Hydro canal, is mentioned as a likely appointee by the Dominion Government to the joint engineering board which is to inquire into the St. Lawrence power and waterways project.

Stanley A. Cullington of the Bond plant of the American Radiator Co., C. C. McDonald of the Wickwire-Spencer Steel Corp. and John J. Ryan of the Automatic Transportation Co. were among those elected directors of the Safety Club of the Buffalo Chamber of Commerce for 1924.

Charles F. Rand, New York, chairman of the Engineering Foundation, has been elected chairman of the John Fritz Medal Board of Award. Fred J. Miller is the new secretary.

Mrs. Nellie Lowry, widow of the late Dr. A. C. Lowry, was elected president of the Marting Iron & Steel Co. at Ironton, Ohio, March 19. Mrs. Lowry is a daughter of the late Col. H. A. Marting, and succeeds to the presidency which was formerly held by her husband. No other changes in the officials were made.

C. A. Paquette has resigned as chief engineer of the Big Four Railroads and will become connected with the M. E. White Construction Co., Chicago. Hadley Baldwin, an employee of the Big Four road for 30 years, succeeds Mr. Paquette.

J. L. Schueler, metallurgist of the Keystone Steel & Wire Co., Peoria, Ill., has been appointed superintendent of the open-hearth department to succeed Alexander G. Black, who recently resigned to become superintendent of the open hearth department at the Vandergrift, Pa., works of the American Sheet & Tin Plate Co.

H. A. Sicker of West Lafayette, Ohio, and A. H. Fisher, Cleveland, have been elected to the directorate of the Consolidated Steel & Iron Corporation, Terre Haute, Ind., which company recently acquired the Terre Haute Auto Spring Co. and Hoosier Rolling Mill of Terre Haute.

W. R. Yorkey, who has been in the Boston office of the Electric Controller & Mfg. Co., Cleveland, will become manager in New York of the combined Boston and New York offices. H. K. Hardcastle is district manager of a newly established Philadelphia office.

John F. Wade, formerly works manager of the Bristol Brass Corporation, Bristol, Conn., but more recently engaged in looking after the personal property of that concern, has resigned. He has been mayor of his city for three terms. Previous to his connection with the brass company he was general superintendent New Departure Bell Co., Bristol.

Irwin B. Laughlin, recently nominated as Minister to Greece by President Coolidge, for several years following his graduation from Yale University in 1893 was treasurer of the Jones & Laughlin Steel Co. (now corporation), Pittsburgh. His grandfather, James Laughlin, was one of the founders of the firm of Jones & Laughlin, and his father, Maj. George M. Laughlin, at time of his death was vice-chairman of Jones & Laughlin, Ltd., of which the present company is a successor. Mr. Laughlin was born in Pittsburgh in 1871 and entered the diplomatic service of the country in 1903 as private secretary to the then United States Minister to Japan. Since then he has served as second secretary to the American legation at Tokio, secretary of legation at Bangkok, consul general for Siam, second secretary of legation at Peking, second secretary of embassy at Petrograd, secretary to legation in Greece and Montenegro, second secretary to embassy at Paris, secretary to special embassy to Sultan of Turkey, secretary Berlin embassy and subsequently chargé d'affaires there, secretary to embassy at London and then chargé d'affaires and counsellor there. During the conference on limitation of arms at Washington he was secretary to United States Senator Henry Cabot Lodge.

Frank R. Frost, general manager of sales for the Superior Steel Corporation, Pittsburgh, has been elected vice-president of that company.

E. H. Warner, located at 76 West Alvord Street, Springfield, Mass., has been appointed sales representative in Connecticut, western Massachusetts, New Hampshire and Vermont for the Reed-Prentice Co., Worcester, Mass.

Obituary

H. D. MEGARY, managing director of the Consolidated Pneumatic Tool Co., London, England, died after a short illness on March 20. He was born in Philadelphia in 1888, attended school in that city and was graduated from the University of Pennsylvania in 1909. Following graduation he became affiliated with the Bethlehem Steel Co., with which he remained until June, 1918, when he became connected with the Chicago Pneumatic Tool Co. as assistant to the president, later being made secretary of the company. In 1921 he was transferred to London to assume the duties of managing director of the English company and to direct sales in Europe.

CHARLES F. PHILLIPS, general manager and a director of the Stewart Furnace Co., Sharon, Pa., died suddenly at Atlantic City, March 22, aged 60 years. He played a prominent part in the development and success of the Stewart company, with which he had been identified 40 years. He was a son of the late John Phillips, a pioneer resident of Sharon, where he had lived all his life. He was president of the Union Limestone Co.

JOHN W. ELDREDGE, vice-president National Sewing Machine Co., Belvidere, Ill., died March 18.

WILLIAM H. STARKE, vice-president and purchasing agent of the Central Foundry Co., New York, died in his forty-fifth year at the New York Hospital on March 22, after an illness of three months. He became associated with the company in 1907 and soon was appointed purchasing agent, in which capacity he served 14 years. Two years ago, he was elected vice-president in charge of sales and held both positions at the time of his death.

OUR MANGANESE RESOURCES

Less Than Four Years' Requirements of High-Grade Ore Deposits

The sub-committee on manganese has just made public its report to the committee on foreign and domestic mining policy of the Mining and Metallurgical Society of America, covering an investigation of large importance to the American steel industry. Beginning its work late in 1921, the committee undertook the work of answering the question: How much manganese does the United States require and what are the domestic manganese ore resources?

The report, which covers 14 pages in pamphlet form, discusses first the consumption of manganese and how it is used in the steel and chemical industries. The average consumption of metallic manganese per ton of steel for the past 12 years has been found to be 13.9 lb., with a slight but steady trend downward. Discussing the steel output of the country for the past 12 years, the report states that an annual average of 50,000,000 tons should be reached some time between 1930 and 1935 and that, for the purpose of its report, the committee decided to use 50,000,000 tons as the basis.

Such an output of steel at 13 lb. of metallic manganese per ton would require 290,000 gross tons of metallic manganese, of which from 29,000 to 44,000 tons could be in the form of spiegeleisen. The practice of increasing the residual manganese in the bath of the open-hearth furnace by additions of high manganese pig iron to the charge is also considered. The estimate of 10,000 tons of metallic manganese in the form of ferromanganese for the foundry business and for special alloys is also included.

These quantities, translated into terms of domestic ore in round figures, are given as follows:

Annual Requirements

Grade	Per Cent Mn in Ore	Tons Mn Required	Conversion Loss, Per Cent	Tons of Ore
Ferromanganese ..	41.30	220,000	25	710,000
Spiegeleisen	16.00	37,000	30	330,000
Mn-Pig	9.75	43,000	30	630,000

Taking up the question of domestic resources, the report states that 1850 manganese deposits, alleged deposits and prospects have been carefully reviewed. A $50 index price on a 50 per cent base was assumed by the committee as a standard by which to measure the ore, the reasons for this being fully given in the report. Detailed tables are then presented, summarizing the indicated total, reasonably possible, reserves of the country. In a summary for ready comparison the requirements and resources are given as follows:

Domestic Resources

	$50 Index Price, 50 Per cent Reasonably Probable Reserves, Tons Ore	Tons Manganese	
		Contained	Recoverable
Ferromanganese .	1,400,000	578,000	433,000
Spiegeleisen	13,158,000	2,114,290	1,480,000
Mn-Pig	22,050 000	2,147,500	1,500,000
Chemical	270,000	.....	.....

The committee then draws the conclusion from these data that there must be no question regarding the total inadequacy of the domestic resources of "ferro-grade" [high grade] ores, and states that there is "no conceivable legislation within the bounds of reason which can make these sufficient for the needs of the United States."

There then follows a discussion of the adaptation of low-grade reserves and a review of foreign resources, those of Russia, India and Brazil. The average pre-war cost per unit of manganese ore delivered from these three countries is given as 17.2c. per unit at German ports, as 16 1/3c. per unit at English ports and as 17.5c. per unit at American ports.

At the end of the report the following definite conclusions are offered:

(1) The domestic resources of ferro-grade and chemical ores of the United States are so out of balance with the major foreign resources that, under natural conditions of international exchange, imports of such ores into the United States can be *efficiently* stopped only at great cost.

(2) Should nevertheless legislation be enacted which should effect a measurable substitution of domestic for foreign ferro-ores, the chief result, aside from the cost, would be the dangerous depletion of reserves which as it is are totally inadequate for the country's needs.

(3) Domestic resources of low grade reserves on the other hand are comparatively adequate. Any effective attempt however to force their adaptation to the country's needs beyond the normal development which may be looked for through increase in skill and vigorous educational campaign would result in a cost so enormous as to be quite disproportionate to the purpose to be served.

The committee consists of C. M. Weld, chairman, and J. W. Furness, D. F. Hewett, Robert Linton, John A. Mathews, J. V. W. Reynders and Bradley Stoughton.

Refractories Manufacturers Association Meets in St. Louis

Retiring officers of the Refractories Manufacturers Association were reelected at the annual meeting held at Chase Hotel, St. Louis, March 19 and 20. They are Frank R. Valentine, M. D. Valentine & Brother Co., Woodbridge, N. J., president; J. M. McKinley, Crescent Refractories Co., Curwensville, Pa., first vice-president; C. C. Edmunds, McLain Fire Brick Co., Pittsburgh, treasurer and F. W. Donahoe, Pittsburgh, secretary. The constitution of the association was amended prior to the election to permit the election of a second vice-president and Allen P. Green, A. P. Green Fire Brick Co., Mexico, Mo., was chosen for that office. John T. Roberts, Stockton Fire Brick Co., San Francisco, was elected to the executive committee, vice Howard Frost, Los Angeles Pressed Brick Co., Los Angeles, and E. F. Myers, Ironton Fire Brick Co., Ironton, Ohio, to succeed E. M. Weinfurtner, Ashland Fire Brick Co., Ashland, Ky.

Nathan B. Williams, associate counsel, National Association of Manufacturers, Washington, and Cullen W. Parmelee, dean of the department of ceramics, University of Illinois, addressed the gathering. Mr. Williams talked on trade associations, their purposes, functions and limitations, defining what was and was not legal in such organizations. Professor Parmelee made a stirring plea for cooperation on the part of the association with educational institutions maintaining ceramic departments. He made special reference to the advisability of offering prizes to high school students for essays on refractories, the thought being that such competition would stimulate interest in the subject and directly lead to increased enrollments of students seeking the degree of Engineer in Ceramics and possibly a demand for the establishment of ceramic schools in colleges now lacking them. Suggestion also was made of the employment of students for summer work in the plants, this work to count toward the degree.

George A. Balz, Seaboard Refractories Co., Perth Amboy, N. J., was appointed chairman of a committee to take up Professor Parmelee's suggestions, with an idea of early formulation and application of a plan.

Capacity of Youngstown Sheet & Tube Co.

The Youngstown Sheet & Tube Co., Youngstown, estimates its annual maximum capacity for the production of the principal products as follows:

Coke	2,604,100 tons
Benzol	4,410,000 gal.
Pig iron	2,624,800 tons
Open-hearth steel ingots.....	1,836,000 tons
Bessemer steel ingots.....	1,276,000 tons
Skelp	1,276,000 tons
Welded pipe	1,142,112 tons
Sheets	294,000 tons
Plates	606,720 tons
Bars	300,000 tons
Wire and wire products.....	120,000 tons

Last year the number of distinct and separate products manufactured was more than 100. The theoretical production capacity of the company has been somewhat more than doubled by acquisition of the Brier Hill Steel Co. and the Steel & Tube Co. of America.

Coordination of the various properties has been progressing rapidly during the past nine months.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	42¾	45½	Lima Loco.	63¾	65¼
Allis-Chal. pf....	93⅞	95	Midvale Steel ...	30	30
Am. B. S. & Fdy.	78½	80	Nat.-Acme	8	8¼
Am. Can 112	5⅝	119⅛	Nat. En. & Stm.	32⅛	33⅛
Am. Can pf.....113	½	114	Nat. En. & S. pf.	87	87
Am. Car & Fdy..160		162¼	N. Y. Air Brake	39⅜	40⅞
Am. Locomotive.	72½	73¾	Nova Scotia Stl..	12	12¼
Am. Loco. pf....117		118	Otis Steel	9¼	11
Am. Radiator ..100		107⅛	Otis Steel pf....	63	71
Am. Steel Fdries.	37	38	Pressed Steel Car	51½	54
Am. Stl. Fd. pf..104		104½	Pressed Steel pf.	86½	86½
Bald. Loco. 119	¾	122¾	Replogle Steel ..	9½	10¼
Beth. Steel	51⅝	55¾	Republic	48	54¼
Beth. Stl. 7% pf.	94	95	Republic pf.	88	91¼
Beth. Stl. 8% pf.107	¼	107½	Sloss-Sheffield ..	58	61
Br. Em. Steel...	4¼	4¼	Steel of Canada..	80½	81¼
Chic. Pneu. Tool	83	83¼	Superior Steel...	31	32¾
Colo. Fuel	31¼	34	Un. Alloy Steel..	27	33½
Crucible Steel ..	55⅞	61	U. S. Pipe.....	74¼	81¼
Crucible Stl. pf..	88¾	88¾	U. S. Pipe pf....	87½	87¾
Deere pf.	65	66	U. S. Steel.....	98¼	102¼
Gen. Electric ...220		231½	U. S. Steel pf...118¾		119¾
Gt. No. Ore Cert.	29¼	30	Vanadium Steel..	25¼	30½
Gulf States Steel	75	80	Va. I., C. & C. pf.	78	78
Inland	34½	35½	W'house Air Br.	90⅜	92
Int. Har.	83	85½	Y'gstown S. & T.	65¼	66½
Jones & L'lin pf.110		110			

Earnings of Industrial Companies

Allowing for depreciation, the Union Twist Drill Co.'s 1923 report shows net profits of $376,448, whereas in 1922 it had an operating loss of $146,241. Sinking fund reserve rose from $62,620 in 1922 to $296,919 last year. Inventories remained at better than $2,250,000, but otherwise the liquid cash position at the end of 1923 was very much better than on Dec. 31, 1922.

The balance sheet of the Norton Co., Worcester, Mass., maker of abrasives and grinding machinery, as of Dec. 31, last, shows total assets and liabilities of $17,847,568, against $16,628,298 on Dec. 31, 1922. Merchandise value was $4,782,323, an increase of $898,502 over 1922; cash and debts receivable increased $912,852 to $3,621,046 and investments decreased $886,220 to $2,821,110, while miscellaneous assets increased $165,090 to $554,929. Capitalization was reduced $926,000 to $13,994,000; deferred charges increased $294,333 to $321,537 and the surplus account increased $1,850,937 to $3,532,031.

The Griffin Wheel Co., Boston, maker of car wheels, in a statement dated Dec. 31 issued to the Massachusetts commission of corporations gives its assets and liabilities as $21,745,877, compared with $20,513,129 at the close of 1922. The surplus account indicates a net profit of $1,865,765 last year, after reserving $534,021 for taxes and $82,526 for other purposes. Accounts payable stood at $370,289 against $1,537,120 on Dec. 31, 1922. Investments increased approximately $2,000,000 last year, but comparatively little change is noted between the 1923 and 1922 assets otherwise.

Total assets and liabilities of the Keith Car & Mfg. Co., Sagamore, Mass., builder of railroad equipment, on Dec. 31, last, were $6,029,049, according to a statement filed with the Massachusetts commissioner of corporations. At the close of 1922 they were $4,568,908. Merchandise, material and stock in process of manufacture totaled $2,034,509, which compares with $953,430 at the end of 1922. Little difference is noted in the other assets for the two periods. The profit and loss item for 1923 is blank, whereas on Dec. 31, 1922, it stood at $77,362.

Net profit of the American Radiator Co. for 1923 amounted to $9,168,017, after charges, depreciation and Federal taxes. Net profits of its European companies last year were reported at $1,800,959, making total net profit of $10,968,977, compared with $6,003,556 in 1922.

The Harbison-Walker Refractories Co. reports net profits for 1923 of $3,561,582, after charges and Federal taxes. This was equivalent after preferred dividends, to $12.92 per share earned on $27,000,000 in common stock. Net income in 1922 was $2,479,539 or $8.56 per share.

Industrial News Items

Sale of the Standard Welding plant of the Standard Parts Co., Cleveland, to Andrew, Squire, attorney, for $625,000 has been authorized by the Federal Court. This property consists of eight acres of land and buildings having 400,000 sq. ft. of floor space. Another dividend of 1½ per cent to creditors of the Standard Parts Co. has been ordered by Frank A. Scott, receiver. This makes 70 per cent thus far paid and it is stated that creditors will receive 75 per cent on their claims.

Negotiations for the merger of the Wellman-Seaver-Morgan Co. and the McMyler Interstate Co., Bedford, Ohio, have been abandoned, according to an announcement made by Edwin S. Church, president of the former company. The proposed consolidation has been under consideration for several weeks.

The Empire Gas & Electric Co., Geneva, N. Y., has applied to the Public Service Commission for an order authorizing it to purchase capital stock of the Seneca Power Corporation, Seneca Falls, N. Y., to the amount of 12,350 shares valued at $1,235,000 at par. Authority is also sought to issue common stock of $1,000,000 and 7 per cent preferred stock to the amount of $200,000.

The Coulter Mfg. Co., 259 Austin Street, Buffalo, has filed in Federal Court a voluntary petition in bankruptcy showing liabilities of $152,571 and assets of $34,432. Among the principal creditors are the People's Bank of Buffalo, holding notes for $72,207, and A. J. Coulter, president of the company, who holds firm notes for $65,570. Both are secured claims. The principal assets of the firm, which formerly made automobile steering wheels, are $25,000 in machinery and $5,000 in office fixtures.

Federal Judge Hazel confirmed the sale of the property of the defunct Sizer Steel Co. on March 22 to John N. Pistell, agent for the first mortgage bondholders' committee. Adrian Block, attorney for the receivers, stated that the price was about $206,000. This was a receivership in equity, the receivers being Stewart F. Hancock, Syracuse, N. Y.; C. B. Porter and John T. Dillon, Buffalo. The bondholders' committee, it is expected, will make an effort to dispose of the property for the benefit of the bondholders. The property consists of a steel forgings plant in Buffalo and one in Solvay, N. Y., with equipment and buildings constituting the mortgaged assets and unmortgaged assets consisting of manufactured steel, office equipment and loose tools. Intangible assets, including the accounts receivable, were not disposed of at the sale.

Sale of the bankrupt Fulton Machine & Vise Co., Lowville, N. Y., has been set for April 3 at Lowville court house, by John B. Rogers, referee in bankruptcy. The company undertook to manufacture shell tips for the Russian Government, installing for that purpose $40,000 worth of machinery, but when the revolution came all contracts were rescinded.

Sale of the machinery and personal property of the Herschel-Spillman Motor Co., North Tonawanda, N. Y., involuntary bankrupt, by the Simmons Machine & Tool Corporation of Albany has been ordered. The sale must yield not less than $235,000 net for the creditors. The Simmons corporation is also to sell the real property, subject to the approval of the referee. The contract provides that the trustee of the estate, H. K. Wilson, may sell the entire plant as a going concern. Liabilities are estimated at $1,500,000 and assets at $712,000. Prior claims amount to $350,000.

New Grinder Company Organized

The Heim Grinder Co. has been organized with a Connecticut charter and has acquired the entire interests of the Ball & Roller Bearing Co. in the Heim centerless grinder, the manufacture of which it will continue in the present plant at Danbury, Conn. The officers of the new company are: President, Henry M. Flynt; vice-president, Clayton O. Smith, Worcester, Mass.; secretary and treasurer, Ferris M. Angewin. Mr. Smith will manage the business, dividing his time between Danbury and Worcester, where he will continue his duties as treasurer and manager of the O. S. Walker Co.

The Goodwin Automatic Fire Alarm Corporation, Cedar Bluff, Va., organized with authorized capital of $150,000, will manufacture fire alarms. Parts will be obtained from outside concerns. It will purchase rubber covered wire, batteries, bells, gongs and annunciators. James E. Goodwin is president.

The Machinery Engineering Co., with shop at 2602 East Trent Road and office at West 20 Riverside Avenue, Spokane, Wash., is constructing a building and will install machinery. Manufacturing plans are indefinite as yet. A small amount of work will be let by contract. J. L. Fallquist is president.

The Becker Pipe Wrench Co., Saginaw, Mich., has been organized to manufacture pipe wrenches designed by the president. A building has been leased and equipment is being purchased. Steel castings will be made outside. John L. Jackson is one of the principals.

Plans of New Companies

The Liquidometer Co., 250 West Fifty-Seventh Street, New York, recently incorporated with $25,000 preferred stock and 10,000 shares of no par value stock, to manufacture a new instrument for measuring and recording the liquid contents of tanks, will manufacture by contract and maintain an assembling plant in New York. A small amount of equipment will be needed, consisting mainly of vacuum tanks. It is expected that the product will be ready for the market in two months. M. C. Lachentruch is secretary-treasurer.

The Eagle Engine Works, Inc., has been organized to manufacture engines and boilers. Capital consists of two million shares of no par value stock. William C. Durant, Deal, N. J.; Carroll Downes, Narberth, Pa., and Charles F. Daly, New York, are the principals.

The Blue Bird Motor Device Corporation, New York, organized with $50,000 capital stock to manufacture automotive equipment, will continue the business of a repair shop, formerly conducted by one of the principals, Morris Weinberg, 53 Lewis Street.

The O. B. Fuel Oil Furnace Corporation, 136 Liberty Street, New York, has been organized with $200,000 capital stock to manufacture oil furnaces. Its plans are not definitely known. E. R. Foote, J. R. Biggs and C. H. Chambers are the incorporators.

The Polydine Corporation, 16 West Forty-sixth Street, New York, has been incorporated with 1000 shares of stock, no par value, and will license manufacturers to market radio equipment under the name Polydine.

The Dalrymple-Whitney Radio Corporation, 437 Fifth Avenue, has been incorporated with capital stock of $25,000 and will act as distributor for the products of the Ware Radio Corporation, 529 West Forty-second Street, New York. W. C. Whitney is one of the principals.

The Indicating Calipers Corporation, 506 East Nineteenth Street, New York, incorporated with capital stock of $25,000 will manufacture measuring tools and instruments. Operations are now under way on a small scale. C. H. B. Stepanek heads the company.

Plans are under way for the formation of a new company with capital of approximately $9,000,000 to take over the affairs of the Pierce Oil Corporation, New York. Much of the new working capital to be raised, it is understood, will be used to modernize the company's refineries.

Walter J. Bothwell, formerly Detroit district manager for the Union Drawn Steel Co., Beaver Falls, Pa., also John T. Ferris and Wayne W. Wilson, who were associated with him, and Dean Higgins, Detroit district agent of the Fitzsimons Co., Youngstown, Ohio, have incorporated as the Higgins-Bothwell Co., with offices at 1737-39 Dime Bank Building, Detroit. The new firm will handle cold-finished steels and will supplement direct mill representation service with warehouse stocks.

The Fairfield Oil Heating Co., Inc., Putnam Avenue, Greenwich, Conn., has been organized with E. W. Russell as president-treasurer and John R. Johnson, vice-president and secretary, to manufacture oil burners.

The Heim Grinder Co., Danbury, Conn., recently organized with capital stock of $500,000, will manufacture machine tools and grinding machines. Robert K. Thistle, 65 Cedar Street, Raymond J. Gorman and George V. Reilly, all of New York, are the incorporators.

The Union Ice Machine Co., 1128 Wayne Avenue, Dayton, Ohio, has been organized to continue a business in the distribution, installation and repair of refrigeration and ice-making machinery. Branch offices are maintained at 107 East Long Street, Columbus, Ohio, and at Springfield, Ohio. R. E. Waltz is one of the principals.

The Southern Mfg. Co., Birmingham, Ala., has been organized to manufacture metal cabinets, radiator shields, etc. Its plant is located at 1014 North Twenty-eighth Street, where an addition was recently constructed. D. D. Bentley is sales manager.

The Fox Mfg. Co., Philadelphia, has been organized to manufacture automobile accessories. No equipment will be needed, since the company will use the machinery of the Fox Gun Co.

The McWilliams Mfg. Co., 237 Eddy Street, Providence, R. I., has been organized to manufacture rolling equipment, jewelers' machinery and special machinery. It has taken over the affairs of a company established 40 years ago. A. F. Horton heads the company.

The Home Heating & Refrigerating Co., Inc., 325 Fairfield Avenue, Bridgeport, Conn., has been organized with $50,000 capital stock to act as distributor of oil heating and refrigerating equipment. M. T. Gardner heads the company.

The Stanford Steel Corporation, Milford, Conn., has been organized with $226,000 capital stock to manufacture iron and steel products. The company purchased the business of the Stanford Steel Products Co. last January. George I. Stanford is president and general manager.

The Roman Steel Tennis Net Co., Cumberland, Md., has been organized to manufacture tennis nets of steel and copper. It has leased a plant and started operations. J. Philip Roman is president; W. H. Oswald, vice-president, and M. Montgomery, secretary-treasurer.

The General Tractors Corporation, Nashua, N. H., has been incorporated with $200,000 capital stock to manufacture hydraulic transmission for trucks and tractors. The company will begin at once to manufacture full sized units through the Flather Mfg. Co., Nashua. Henry N. Rice is president and Thomas M. Acken, vice-president.

Kamerer & Hutton, 206 Fifth Avenue, McKeesport, Pa., has been organized to distribute electrical equipment.

The Adams Fence & Wire Co., 57 Pratt Street, Hartford, Conn., has been organized with $50,000 capital stock to act as distributor for the products of the Page Steel & Wire Co. and the Enterprise Iron Works. Francis L. Adams heads the company.

The Pacific Wire Products Co., 1840 East Fifteenth Street, Los Angeles, Cal., has been organized with $250,000 capital stock to manufacture wire goods. Its plant has been running as a department of the Pacific Wire Rope Co. for several years, but will be operated as a separate unit. Raw materials are being purchased in the East. The officers of the company are: Lewis E. Spear, president; Emerson Spear, vice-president and general manager, and E. H. Fisher, secretary-treasurer.

The Reliable Gear & Parts Co., Inc., recently organized, 2015 South Michigan Avenue, Chicago, is a jobber in replacement parts as follows: ring gears, pinion gears, differential cases, differential side gears, differential spider gears, differential crosses, transmission gears, flywheel starter gears, silent timing gears, axle shafts, drive shafts, pinion shafts and bearings. Louis Myers is president; Harry Mickelson, vice-president, and M. Kallmeyer, secretary-treasurer.

The Otis Engine Corporation, 247 Park Avenue, New York, has been organized with 1000 shares of stock, no par value, to manufacture gasoline engines and parts. Announcement of plans will be made in about 30 days. Otis Presbrey, Room 1218, heads the company.

The Gibbs Utilities Co., 501 Fifth Avenue, New York, has been incorporated with $250,000 capital stock, Delaware laws, to manufacture oil burners. It appears likely that manufacturing will be done by contract, while the company provides for assembling and installation. William E. Gibbs is president and Arthur Falk, secretary-treasurer.

The Peninsula Foundry & Machine Co., Alta and Bradford Streets, Portland, Ore, has been organized with $100,000 capital stock and has purchased the plant and business of the Peninsula Foundry & Machine Works, a going company. The foundry has a capacity of ten tons per day. The company will make complete saw mills, rotary pumps, pulleys, transmission, lumber pliers, trucks, washers, etc. M. E. Gleason is president and M. R. Morrow, vice-president and general manager.

The Kanter Mfg. Corporation, 120 Broadway, New York, has been organized to manufacture radio equipment. One contract for manufacturing has been let, but bids will be received on further contracts soon. James L. Moore heads the company.

The Goodman Automatic Water Heater Co., Inc., 523 Atlantic Avenue, Brooklyn, has been organized to manufacture tanks and heaters. Manufacturing will be done by contract. P. Goodman is president.

The Blue Ribbon Battery Mfg. Co., Syracuse, N. Y., has been organized with $50,000 capital stock and 1000 shares of no par common stock to manufacture batteries, having taken over a private enterprise. Equipment will be installed for complete manufacturing operations. Charles S. Kent, 310-11 Everson Building is secretary.

The Charles H. Knapp Co., Wait and Rye Streets, Paterson, N. J., has been incorporated with 1000 shares of stock, no par value, to manufacture special machinery and textile machinery, continuing the manufacture of products designed by the late Charles H. Knapp. It will also manufacture testing instruments, warpers and beamers. John J. Kriesmer is secretary-treasurer.

The Yost Superior Co., after April 1, will represent a consolidation of the Superior Spring Co. and the Yost Gearless Motor Co., Springfield, Ohio. Capital stock of the new company will be $100,000. John L. Lloyd is president, R. A. Essex, vice-president, and B. F. Downey, secretary-treasurer.

Machinery Markets and News of the Works

INQUIRIES OUTNUMBER ORDERS

Machine-Tool Business Shows No Gains, But Quotations Are Numerous

Canadian National Railways Place Orders for American Tools—Santa Fe Adds to List

Inquiries for machine tools far outnumber the orders that are being p'aced. Buyers have not changed their attitude. They are holding off until the last possible minute before placing orders. A relatively small percentage of the inquiries that have been sent out in the past month or so has developed into orders.

Railroad buying and inquiry are the most important features. The Canadian National Railways have placed orders for quite a number of American tools, some of which will go to the Battle Creek, Mich., shops of the Grand Trunk. The Maine Central has bought about a dozen tools and the Lehigh Valley about a half dozen. The Southern Railway has placed no orders on its recent large list, but is expected to begin buying soon. The Santa Fe has sent out inquiries at Chicago for four additional tools, making a total of 173 items on its list of pending purchases.

Industrial companies were buyers in Chicago during the past week. The National Plate Glass Co., Ottawa, Ill., bought about $55,000 worth of tools and Wilson & Co., meat packers, have made purchases totaling about $40,000. Steel companies are expected to be buyers of tools soon. The Youngstown Sheet & Tube Co., Youngstown, Ohio, has added 11 items to its list for shops at Indiana Harbor, Ind. The Illinois Steel Co. has added a few items to its pending inquiry.

Automobile companies are not so active in buying as they were, but the Ford Motor Co. continues to place orders, planers and milling machines having been bought last week. The Studebaker Corporation has also placed a few additional orders.

A little export business has been coming from South America and Cuba and the Japanese situation looks bright for buying within the near future. Officers of the Japanese navy stationed at New York have bought a few tools.

New York

NEW YORK, March 25.

TURRET lathe buying in New England was the feature of the past week's Eastern machine-tool market. A Rhode Island company bought eight and a Boston company bought six. Aside from this most of the buying of importance was done by railroads. The New York Central placed orders for four axle lathes. The Lehigh Valley bought about a half dozen machines. The Maine Central placed orders for a number of machines for its own shops and for the Portland Terminal, Portland, Me. Large orders have been placed by the Canadian National Railways in which American tool builders shared. Some of the machines are for the Grand Trunk shops at Battle Creek, Mich. There is a good deal of miscellaneous inquiry but no change has taken place in the hesitant attitude of buyers in placing orders.

The Cole Metal Products Co., 330 East Twenty-third Street, New York, has purchased property on Harris Avenue, Long Island City, 100 x 200 ft., as a site for a new plant, for which plans will soon be drawn. Louis W. Cole is head.

Oscar Goldschlag, 1482 Broadway, New York, architect, has completed plans for a four-story automobile service and repair building, 100 x 225 ft., on South 155th Street, estimated to cost $200,000, to be erected by a corporation, now being organized.

Joseph Stolz & Son, Inc., Commerce Avenue and 170th Street, New York, iron and steel products, has inquiries out for a hand power guy derrick, about 6 tons capacity.

The Alumor Garage Co., 116 Nassau Street, New York, has filed plans for a six-story service, repair and garage building at 195-99 Washington Street, to cost $180,000. Charles N. Whinston & Brother, 2 Columbus Circle, are architects.

The New York Central Railroad Co., C. S. White, purchasing agent, Room 344, 466 Lexington Avenue, New York, will take bids until April 1 for wire nails and staples, seamless steel tubes, steel bars and other material, serial contract No. 10-1924.

The Albany Garage Co., Albany, N. Y., has awarded a general contract to J. J. Finn & Son, 75 Northern Boulevard, for a ten-story service, repair and garage building on Beaver Street, to cost $750,000 including equipment.

The Fox-Geldberg Holding Corporation, 280 Madison Avenue, New York, will take bids in about a month for a ten-story ice and refrigerating plant, 140 x 250 ft., on Washington Street, estimated to cost $1,250,000 with machinery.

Plans are being arranged by mining interests in northern Manitoba for the construction of a hydroelectric power plant on the Grass River. A fund has been subscribed. The American Consulate Office, J. I. Brittain, consul general, Winnipeg, Man., has information regarding the project.

The Board of Town Trustees, Bronxville, N. Y., plans the installation of manual training equipment in the new two-story junior and senior high school to be erected on the Pondfield Road, estimated to cost $400,000, for which bids on general contract will soon be called by Guilbert & Betelle, Chamber of Commerce Building, Newark, N. J., architects.

Shampan & Shampan, 188 Montague Street, Brooklyn, architects, are drawing plans for an automobile service and repair building, 98 x 100 ft., to be erected on West Forty-first Street, near Ninth Avenue, New York, estimated to cost $300,000 with equipment.

The Fireproof Products Co., 257 East 133rd Street, New York, will operate an addition to its plant at Willow Avenue and 130th Street, where property has been acquired, for cutting steel reinforcing bars and kindred mechanical service. Handling and distributing facilities will also be arranged at this location.

Officials of the Pierce Oil Corporation, 25 Broad Street, New York, are arranging for a reorganization of the company, with an addition of about $9,000,000 in active capital. A portion of the fund will be used for improvements in the refinery with installation of additional equipment.

The Board of Supervisors of Warren County, Glens Falls, N. Y., is having plans drawn for a new central steam power house and a one-story automobile service and repair building for county trucks and cars. Tooker & Marsh, 101 Park Avenue, New York, are architects.

The Northern Union Gas Co., 1815 Webster Avenue, New York, has plans for a new mechanical and equipment maintenance shop, with office building, at 304-12 Kingsbridge Road, and will soon lay foundations. The project will involve more than $100,000. Jardine, Hill & Murdock, 347 Madison Avenue, are architects.

The Cornell Iron Works, Inc., New York, has been incorporated with a capital of $180,000 to succeed to and expand the company of the same name at 601 West Twenty-sixth Street, specializing in the manufacture of fireproof doors, etc. J. M., J. B. and M. L. Cornell head the new organization.

The City Clerk, Ernest F. Webb, Prince Albert, Saskatchewan, will take bids until May 15 for one 1500 kw. steam-turbo generator, with condenser and accessory equipment complete. Specifications at the office of J. Jonsson, superintendent of utilities, Prince Albert.

Manual training equipment will be installed in the school to be erected at Hightstown, N. J., estimated to cost $225,000, for which foundations will soon be laid. The East Windsor Township Board of Education is in charge.

The Brandes Products Co., 196 Mount Pleasant Avenue, Newark, manufacturer of radio instruments, head-sets, etc., has awarded a general contract to the Sutherland-Allen Co., Park Place, for a two-story and basement addition, 85 x 198 ft., estimated to cost $180,000 with equipment. G. E. Jones, Union Building, is architect.

The Morgan Motor Car Co., Broad and Kinney Streets, Newark, representative for the Ford automobile, is planning to lease additional space for extensions in its repair and service departments.

William S. Roe, 15 River Street, Newark, N. J., is in the market for a 50-hp. low pressure heating boiler of the locomotive type, immediate delivery.

Philadelphia

PHILADELPHIA, March 24.

JONES-BEACH & CO., 50 North Seventh Street, Philadelphia, manufacturers of electrical equipment and supplies, have acquired property at 619-29 Wood Street, and 312 North Marshall Street consisting of land and factory for a new plant.

Glass Brothers, Third and Sedgley Streets, Philadelphia, have awarded a contract to George Good, Adams Road, for the erection of a one-story machine shop, on which work will begin at once.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until April 8 for 2000 lb. of copper wire for the Philadelphia navy yard, schedule 2002.

Charles Heinel & Sons, 2320 North Sixth Street, Philadelphia, operating an automobile service and repair works, have acquired the three-story building, 68 x 173 ft., at 3435-39 North Broad Street, for a new plant. Immediate possession will be taken.

H. N. Hill & Co., 308 Chestnut Street, Philadelphia, grease products, etc., are desirous of getting in touch with manufacturers of wire-cloth manufacturing equipment, to handle a foreign inquiry.

Abraham Leibovitz, 4045 Baltimore Street, Philadelphia, has filed plans for two automobile service and repair buildings at 5224-32 Greene Avenue, and at Ridge and Gerhard Avenues, to cost $60,000 and $50,000, respectively.

The Foreign Trade Bureau, Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a concern at Milan, Italy, desirous of getting in touch with American manufacturers of pneumatic hammers for stone-working service, No. 42095; from a company at Ahmedabad, India, in the market for American lathes and milling machines; also gear-cutting machines, suitable for cutting teeth in wheel and pinion blanks from 3 to 4 in. diameter, No. 42099.

The Doehler Die Casting Co., Court and Ninth Streets, Brooklyn, N. Y., has taken over the former die casting department of the Light Mfg. & Foundry Co., Union Street, Pottstown, Pa., for a branch works, to be known as the Light Mfg. & Foundry Division of the Doehler company.

The Charles Warner Co., Morris Building, Philadelphia, with headquarters at Wilmington, Del., operating a building material supply business, has acquired property at Tullytown, Pa., and will equip for sand and gravel production, including steam shovels, elevating and conveying machinery and other equipment, estimated to cost $500,000.

Manual training equipment will be installed in the new three-story junior high school to be erected at Tenth and Chestnut Streets, Reading, Pa., estimated to cost $1,000,000, for which bids have been asked on a general contract. Edward Z. Scholl, 136 Robeson Street, is architect.

Bids will be received by the Quartermaster, Tobyhanna artillery target range, Tobyhanna, Pa., until April 1 for two centrifugal pumps for installation in local power plant, and for one steel water tank.

The Lehigh Coal & Navigation Co., 437 Chestnut Street, Philadelphia, will proceed at an early date with the construction of a steel coal tipple in the Panther Creek Valley section, near Lansford, Pa., to cost approximately $1,500,000 with machinery.

The Ideal Power Co., Swartz Building, Columbia, Pa., recently organized, is planning for the establishment of a plant to manufacture patented fuel-saving devices and equipment. D. W. Shaeffer, Lancaster, Pa., is president, and Eugene Fisher, inventor of the device, an official of the company.

The Philadelphia & Reading Railway, Philadelphia, will electrify its line between St. Clair and Frackville, Pa., at an estimated cost of $1,500,000, including automatic power substations, line equipment, etc. Preliminary plans and surveys are now under way.

About $25,000 worth of manual training equipment will be purchased by the Board of School Trustees for a new high school at Bradford, Pa., estimated to cost $350,000, for which bids were received on a general contract March 14.

Buffalo

BUFFALO, March 24.

PLANS are being considered by the Algonquin Paper Co., Ogdensburg, N. Y., for a one-story addition, 75 x 200 ft., estimated to cost $180,000 including equipment.

The Jamestown Panel Co., Steel Street, Jamestown, N. Y., is asking bids for a two-story addition, 50 x 130 ft., to cost about $23,000. Beck & Tinkham, Phillips Building, are architects.

The Spaulding Fiber Co., Wheeler Street, Tonawanda, N. Y., has filed plans for additions to its plant to cost about $130,000 including equipment, on which work will begin at once.

F. P. Hunt, 115 Pitkin Street, Rochester, N. Y., will take bids at once for a two-story automobile service and repair building, 90 x 160 ft., estimated to cost $75,000 with equipment.

The Board of Water Commissioners, Dunkirk, N. Y., will take bids until April 2 for one steam-operated pumping engine, horizontal cross compound, crank and flywheel condensing type, with capacity of 8,000,000 gal. per day. Specifications on file at the office noted.

The Seneca Cement & Rock Co., Buffalo, has made application for permission to operate a plant at 186-92 Colgate Avenue for the manufacture of cement blocks and kindred products.

The Pierce Arrow Motor Car Co., Elmwood Avenue, Buffalo, will develop a portion of its plant for the manufacture of a moderate-priced six-cylinder automobile and parts, continuing the production of its regular line of automobiles and motor trucks. It is expected to have the new car ready for the market during the summer. Myron E. Forbes is president.

The Commissioner of Public Works, William F. Schwartz, Municipal Building, Buffalo, contemplates the purchase of an electric crane, air compressors, pumps, motors and other equipment for the department, for which bids will be taken at once.

The Oneida Community, Ltd., Oneida, N. Y., manufacturer of plated table ware, animal traps, etc., has awarded a general contract to the Austin Co., Cleveland, for an addition to its plant at Sherrill, N. Y., estimated to cost $200,000 including equipment. The company is arranging an expansion program and purposes to construct other units later.

The Hewitt Rubber Co., Buffalo, will build a machine shop to cost $7,000.

New England

BOSTON, March 24.

MARCH will be a lean month with most machine tool dealers in this territory. In the past week the taking of a dozen or more tools by the Maine Central Railroad, the most important of which were four lathes and a bushing press, and the purchase of a car wheel borer, punch and shear and another tool by the Grand Trunk, together with an occasional tool here and there has served to hold attention of the trade. With the closing of the month, however, less optimism is noticeable among dealers. A few prospects, because of the uncertain political situation, have definitely decided not to purchase new equipment, some of the machines on which negotiations had been going on being expensive.

The sale last week of the equipment of the Franklin Machine Tool Co., Springfield, Mass., valve grinders, attracted certain manufacturers heretofore in the market for used metal-working tools.

The Crane Market

THE volume of inquiries for electric overhead traveling cranes continues large. Although in the New York district inquiries are generally confined to one or two cranes, other territories report current requests for bids on some fairly large lists. In the West, the Atchison, Topeka & Santa Fe is accepting quotations on a list of seven cranes for San Bernardino, Cal. It is reported that the Foundation Co., 120 Liberty Street, New York, has been awarded contract for construction of new shops for the Southern Railway Co. The Lehigh Valley Railroad, 143 Liberty Street, New York, is said to have closed on two 25-ton gantry cranes with a Western builder. The De La Vergne Machine Co., New York, has purchased the 10-ton electric crane for which inquiry was recently issued. An export inquiry has been issued by the New York Steel Exchange, 233 Broadway, New York, for a 5-ton locomotive crane, 5-ft. 6-in. gage, to burn coal, cordwood or crude oil. There is also an extensive list of spare parts included. Quotations must be f.a.s. New York. It is understood that the General Electric Co., Schenectady, N. Y., is about to close on several of the cranes now pending.

In the Pittsburgh district the crane market has been featured by an order for seven overhead cranes by the Youngstown Sheet & Tube Co., two for Indiana Harbor and the others for the new sheet mill at Youngstown. It is understood that recommendations have been made on the 19 cranes for the Gary tube works of the National Tube Co. and awards are expected soon.

The Supply Officer, United States Navy, Boston is accepting bids for furnishing five 2-ton trolley hoists.

Among recent purchases are:

Youngstown Sheet & Tube Co., Youngstown, seven overhead cranes, two for Indiana Harbor and five for the new sheet mill at Youngstown, from the Morgan Engineering Co.

Allegheny Steel Co., Brackenridge, Pa., a 5-ton, 70-ft. span, 5-motor, soaking pit crane, from the Morgan Engineering Co.

National Forge & Tool Co., Irvington, Pa., a 10-ton, 3-motor crane, from a Michigan builder.

Botany Worsted Mills, Passaic, N. J., a 10-ton, 17-ft. 10-in. span hand power crane, from Alfred Box & Co.

Dante G. Crisonino, Mount Vernon, N. Y., a 4-ton, 32-ft. 2-in. span, 2-motor overhead crane, from Alfred Box & Co.

Dwight P. Robinson & Co., New York, a 250-ton, 75-ft. span transfer table for the Southern Railway, from the Whiting Corporation.

Columbia Power Co., Cincinnati, a 110-ton, 107-ft. span, 4-motor, electric traveling crane, from the Whiting Corporation.

Toledo, St. Louis & Western Railroad, a locomotive hoist, from the Whiting Corporation.

Clark Equipment Co., Buchanan, Mich., a 2½-ton hand power crane, from the Whiting Corporation.

Junction City Water Works, Junction City, Kan., a 6-ton hand power crane, from the Whiting Corporation.

Shippers Car Line Co., Milton, Pa., a 10-ton, 88-ft. span, 3-motor, cage control overhead crane, from the Shepard Electric Crane & Hoist Co.

Genesee Bridge & Iron Co., Rochester, N. Y., a 5-ton, 60-ft. span overhead crane, from the Shepard Electric Crane & Hoist Co.

Public Service Corporation, Newark, N. J., a 60-ton, 110-ft. span, used Industrial locomotive crane for steel erection, from Philip T. King, New York.

Lansing Fuel Co., Lansing, Mich., a 20-ton locomotive crane, from the Brown Hoisting Machinery Co.

H. R. Goeller, Hillside, N. J., a 2-ton, 33-ft. span single I beam hand power crane, from the Chisholm-Moore Mfg. Co.

Excel Foundry, Lebanon, N. J., three 1-ton, 20-ft. span cranes and 400 ft. of track, from the Chisholm-Moore Mfg. Co.

The *World*, New York, a 3-ton monorail hoist, from an unnamed seller.

Not until April 5, at least, will the Salem Railroad Terminal Co., 200 Devonshire Street, Boston, decide final plans for a coal handling plant to be erected. Conveying machinery will be required. Charles H. Tenney Co., 200 Devonshire Street, Boston, are the engineers.

The three-story and basement, 60 x 300 ft. Wallingford, Vt., plant of the American Fork & Hoe Co., Cleveland, last week was practically destroyed by fire. The foundry was saved.

Smith & Walker, 80 Boylston Street, Boston, architects, are taking bids for a two-story, 52 x 153 ft. machine shop to be erected in Peabody, Mass., by the Danvers Bleachery.

Contract has been awarded for the erection of a three-story, 44 x 144 ft. woodworking plant for the L. F. Dettenborn Woodworking Co., 337 Sheldon Street, Hartford, Conn. Plans are private.

The General Radio Co., 11 Windsor Street, Cambridge, Mass., is having plans prepared for a three-story, 50 x 95 ft. plant on Windsor Street. Lockwood, Greene & Co., 24 Federal Street, Boston, are the engineers. Commercial electric power will be used.

Bids will shortly be asked on a two-story, 76 x 150 ft. and 44 x 108 ft. Marcia C. Browne School, Broadway, Malden, Mass., plans for which are being prepared. Manual training equipment will be required. The cost of the school, exclusive of equipment, is $350,000. M. A. Dyer, 1 Beacon Street, Boston, is the architect.

Contract has been awarded by Samuel Cabot, Inc., 141 Milk Street, Boston, for an addition to its Chelsea, Mass., plant, 50 x 225 ft., for the manufacture of lamp black. Fan and other equipment is required. Plans are private.

The Bridgeport Safety Emery Wheel Co., 82 Knowlton Street, Bridgeport, Conn., has tentative plans for a new one and two-story brick factory at Stratford, Conn. When completed the Bridgeport plant will probably be abandoned.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until April 1 for 12 pressure gages for the Portsmouth, N. H., Navy Yard, schedule 1989.

The Gordon Electric Mfg. Co., Waterville, Conn., manufacturer of wire products and other electrical apparatus, is perfecting plans for a Pacific Coast branch at Los Angeles, for general distributing and other service, to be ready for operation in May. I. R. Seltzer is resigning as president and general manager of the company and will dispose of considerable interest in the company.

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The Crane Market

THE volume of inquiries for electric overhead traveling cranes continues large. Although in the New York district inquiries are generally confined to one or two cranes, other territories report current requests for bids on some fairly large lists. In the West, the Atchison, Topeka & Santa Fe is accepting quotations on a list of seven cranes for San Bernardino, Cal. It is reported that the Foundation Co., 120 Liberty Street, New York, has been awarded contract for construction of new shops for the Southern Railway Co. The Lehigh Valley Railroad, 143 Liberty Street, New York, is said to have closed on two 25-ton gantry cranes with a Western builder. The De La Vergne Machine Co., New York, has purchased the 10-ton electric crane for which inquiry was recently issued. An export inquiry has been issued by the New York Steel Exchange, 233 Broadway, New York, for a 5-ton locomotive crane, 5-ft. 6-in. gage, to burn coal, cordwood or crude oil. There is also an extensive list of spare parts included. Quotations must be f.a.s. New York. It is understood that the General Electric Co., Schenectady, N. Y., is about to close on several of the cranes now pending.

In the Pittsburgh district the crane market has been featured by an order for seven overhead cranes by the Youngstown Sheet & Tube Co., two for Indiana Harbor and the others for the new sheet mill at Youngstown. It is understood that recommendations have been made on the 19 cranes for the Gary tube works of the National Tube Co. and awards are expected soon.

The Supply Officer, United States Navy, Boston is accepting bids for furnishing five 2-ton trolley hoists.

Among recent purchases are:

Youngstown Sheet & Tube Co., Youngstown, seven overhead cranes, two for Indiana Harbor and five for the new sheet mill at Youngstown, from the Morgan Engineering Co.

Allegheny Steel Co., Brackenridge, Pa., a 5-ton, 70-ft. span, 5-motor, soaking pit crane, from the Morgan Engineering Co.

National Forge & Tool Co., Irvington, Pa., a 10-ton, 3-motor crane, from a Michigan builder.

Botany Worsted Mills, Passaic, N. J., a 10-ton, 17-ft. 10-in. span hand power crane, from Alfred Box & Co.

Dante G. Crisonino, Mount Vernon, N. Y., a 4-ton, 32-ft. 2-in. span, 2-motor overhead crane, from Alfred Box & Co.

Dwight P. Robinson & Co., New York, a 250-ton, 75-ft. span transfer table for the Southern Railway, from the Whiting Corporation.

Columbia Power Co., Cincinnati, a 110-ton, 107-ft. span, 4-motor, electric traveling crane, from the Whiting Corporation.

Toledo, St. Louis & Western Railroad, a locomotive hoist, from the Whiting Corporation.

Clark Equipment Co., Buchanan, Mich., a 2½-ton hand power crane, from the Whiting Corporation.

Junction City Water Works, Junction City, Kan., a 6-ton hand power crane, from the Whiting Corporation.

Shippers Car Line Co., Milton, Pa., a 10-ton, 88-ft. span, 3-motor, cage control overhead crane, from the Shepard Electric Crane & Hoist Co.

Genesee Bridge & Iron Co., Rochester, N. Y., a 5-ton, 60-ft. span overhead crane, from the Shepard Electric Crane & Hoist Co.

Public Service Corporation, Newark, N. J., a 60-ton, 110-ft. span, used Industrial locomotive crane for steel erection, from Philip T. King, New York.

Lansing Fuel Co., Lansing, Mich., a 20-ton locomotive crane, from the Brown Hoisting Machinery Co.

H. R. Goeller, Hillside, N. J., a 2-ton, 33-ft. span single I beam hand power crane, from the Chisholm-Moore Mfg. Co.

Excel Foundry, Lebanon, N. J., three 1-ton, 20-ft. span cranes and 400 ft. of track, from the Chisholm-Moore Mfg. Co.

The *World*, New York, a 3-ton monorail hoist, from an unnamed seller.

Not until April 5, at least, will the Salem Railroad Terminal Co., 200 Devonshire Street, Boston, decide final plans for a coal handling plant to be erected. Conveying machinery will be required. Charles H. Tenney Co., 200 Devonshire Street, Boston, are the engineers.

The three-story and basement, 60 x 300 ft. Wallingford, Vt., plant of the American Fork & Hoe Co., Cleveland, last week was practically destroyed by fire. The foundry was saved.

Smith & Walker, 80 Boylston Street, Boston, architects, are taking bids for a two-story, 52 x 153 ft. machine shop to be erected in Peabody, Mass., by the Danvers Bleachery.

Contract has been awarded for the erection of a three-story, 44 x 144 ft. woodworking plant for the L. F. Dettenborn Woodworking Co., 337 Sheldon Street, Hartford, Conn. Plans are private.

The General Radio Co., 11 Windsor Street, Cambridge, Mass., is having plans prepared for a three-story, 50 x 95 ft. plant on Windsor Street. Lockwood, Greene & Co., 24 Federal Street, Boston, are the engineers. Commercial electric power will be used.

Bids will shortly be asked on a two-story, 76 x 150 ft. and 44 x 108 ft. Marcia C. Browne School, Broadway, Malden, Mass., plans for which are being prepared. Manual training equipment will be required. The cost of the school, exclusive of equipment, is $350,000. M. A. Dyer, 1 Beacon Street, Boston, is the architect.

Contract has been awarded by Samuel Cabot, Inc., 141 Milk Street, Boston, for an addition to its Chelsea, Mass., plant, 50 x 225 ft., for the manufacture of lamp black. Fan and other equipment is required. Plans are private.

The Bridgeport Safety Emery Wheel Co., 82 Knowlton Street, Bridgeport, Conn., has tentative plans for a new one and two-story brick factory at Stratford, Conn. When completed the Bridgeport plant will probably be abandoned.

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Central Railroad Co., which is actively interested in the plant.

The E. DeLong Co., 5518 Van Dyke Avenue, Detroit, is planning for the purchase of a motor-driven power hammer, about 150 lb. capacity.

The Board of Public Works, Jackson, Mich., plans the installation of electric-operated pumping machinery at the proposed municipal sewerage disposal plant, estimated to cost $900,000, for which plans are being prepared by Hoad, Decker, Shoecraft & Drury, 303 State Street, Ann Arbor, Mich., engineers.

The Standard Paper Co., Kalamazoo, Mich., has purchased about five acres and has tentative plans under way for the construction of a new mill with cost placed at $350,000 including equipment. B. C. Dickinson is president.

The Central Welding Co., Lansing, Mich., has acquired property for the immediate erection of a one-story plant, 40 x 100 ft., to cost $35,000. It is proposed to remove the present works to the new location and install additional equipment. H. M. Verplank is head.

The Benzie County Power Co., Frankfort, Mich., is planning for enlargements in its generating plant and the installation of additional equipment. The station is of hydro-electric type, on the Betsey River.

Cincinnati

CINCINNATI, March 24.

THE machine tool business is still spotty, but nevertheless shows improvement in the volume of bookings. There, is however, very little change in the attitude of buyers, who are holding off placing orders. The Studebaker Corporation has been buying tools, a recent purchase being four gear hobbers. The Ford Motor Co. has also bought milling machines and planers and is expected to make further purchases of special tools which it now has on inquiry. The Westingnouse Electric & Mfg. Co., has also been a purchaser, taking from manufacturers in this district five machines during the past 10 days.

Some export business is coming in from South America and Cuba and indications point to considerable activity in the Japanese market. There is now said to be little likelihood of extensive buying by Chinese railroad interests. The Southern Railway is expected to begin placing orders the first week of April and action by the Santa Fe is looked for about April 15. The New York Central will probably place additional orders for equipment during the next two weeks. Lists are now being prepared by the Chesapeake & Ohio and the Lehigh Valley railroads, both of which are expected to be heavy.

The city of Norwood, Ohio, is expected to call for bids for an electric pumping unit for the waterworks department. Louis H. Nolte is mayor and Bush Parker service director.

The United States Engineers' Office, Cincinnati, is taking bids for the erection of three power houses at dams Nos. 34, 36 and 38, Ohio River. Power plant equipment will be installed, for which bids will be asked shortly.

The plant of the National Furniture Co., Evansville, Ind., was damaged $75,000 by fire March 18. It will be rebuilt. D. E. Galdemeyer is president and general manager.

Fire, March 13, destroyed the plant and equipment of the Central Oil Co., Jackson, Tenn., with a loss of $125,000. No plans for rebuilding have been made.

The City Council, Olive Hill, Ky., is contemplating the installation of an electrically operated pumping unit at the municipal waterworks and prices are being sought.

E. Eisenhut, Carrollton, Ohio, is in the market for electrical refrigeration equipment.

The Cincinnati Storage Battery Co., Moorman Avenue, Cincinnati, is taking bids for a one-story and basement plant, 120 x 155 ft., to cost about $50,000 including equipment. Tietig & Lee, Merchants' Building, are architects.

The Globe Folding Box Co., Mill Creek and the Baltimore & Ohio Railroad, manufacturer of paper boxes and containers, has awarded a general contract to the Fisher-De Vore Construction Co., Cincinnati, for a one-story addition, 80 x 225 ft., to cost $75,000 with equipment. Samuel Hannaford & Sons, Dixie Terminal Building, are architects.

The Southland Portland Cement Co., 313 Independent Life Building, Nashville, Tenn., will begin work on its proposed plant at Crab Orchard, Tenn., with power house, estimated to cost $900,000 with machinery. James O. Parker is president.

The Mississippi River Commission, McCall Building, Memphis, Tenn., will take bids until March 31 for fuel oil pumps, oil meters, strainers and oil suction hose.

The East Tennessee Power Co., Lenoir City, Tenn., plans the construction of a new automatic power substation to cost $100,000 including equipment.

The Central Oil Mill Co., Jackson, Tenn., has tentative plans for the rebuilding of the portion of its works recently destroyed by fire, with loss estimated at $125,000 including equipment.

The United States Engineer Office, Memphis, Tenn., will take bids until April 5 for 36,940 ft. of wire cable, as per specifications on file.

The Hudson Motor Sales Co., 337 East Broadway, Louisville, representative for the Hudson automobile, is considering the erection of a service and repair building, estimated to cost $190,000 with equipment.

Pittsburgh

PITTSBURGH, March 24.

THE Carnegie Steel Co. is building a new machine shop at its Homestead works and has issued a list containing about 20 tools. Original plans were for rebuilding, but it was later decided after the appropriation was granted to erect a new shop, the cost of which reduced the amount of money available for new tool purchases. The Youngstown Sheet & Tube Co. has increased the number of machines recently asked for its Indiana Harbor improvements to 10.

At present inquiry for tools is much better than orders. One local house reports having sold two lathes, a band saw and a motor-driven drill press on one order, but as a rule sales run chiefly to single tools. The Westinghouse Air Brake Co., Wilmerding, Pa., which recently placed the order for the structural steel for a new foundry and machine shop is expected to soon issue a list of its tool requirements. In rolling mills equipment, interest centers on the new continuous bar mill to be built by the Jones & Laughlin Steel Corporation at Woodlawn, Pa., which is to be electrically driven.

Bids will soon be asked by the United States District Engineer, Huntington, W. Va., for the construction of a power house at Dam No. 32, Ohio River, for which plans have been approved.

The Dravo Contracting Co., Diamond Building, Pittsburgh, operating local boat-building and repair plants, will erect a new one-story mill and shop at its Neville Island yard, 80 x 275 ft., to cost $50,000.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has completed plans for a two and four-story addition to its Homewood Works, 30 x 62 ft. and 85 x 282 ft., respectively, to cost $175,000. Bernard H. Prack, Keystone Building, is architect.

The Moorhead Electric Machinery Co., 127 Water Street, Pittsburgh, has inquiries out for two motor-generator sets, about 250 kw. capacity, with exciters, panels, etc., complete.

The City Council, Grove City, Pa., is planning for the installation of an electric crane in the proposed municipal electric power plant, for which a new building will be constructed adjoining the municipal waterworks station.

The Carnegie Coal Co., Oliver Building, Pittsburgh, has acquired about 400 acres in Ohio and Brooke counties, West Virginia, and is reported to be planning the installation of machinery and electric power equipment for extensive operations.

Fire, March 19, destroyed two mills at the plant of the Minter Homes Corporation, Huntington, W. Va., manufacturer of portable and knock-down houses, with loss estimated at $325,000 including woodworking and other machinery. It is planned to rebuild.

The Joy Machine Co., Union Trust Building, Pittsburgh, manufacturer of mine loading machinery, etc., has acquired the former plant of the Colborn Machine Tool Co., Franklin, Pa., which removed its works to Cleveland some time ago. The new owner will remodel the structure for a branch works.

The Yellow Cab Motor Fuel Co., 200 South Highland Avenue, Pittsburgh, with headquarters in the American Building, Baltimore, will take bids for an oil storage and distributing plant estimated to cost $100,000 with equipment.

The Diamond Hardware Mfg. Co., 224 Fourth Avenue, Pittsburgh, is considering the construction of a one-story

plant at Twenty-third Street and the Pennsylvania Railroad, Sharpsburg, Pa., to cost $65,000 with equipment. J. H. Diamond is president.

The McDowell Armature & Machine Works, Inc., Bluefield, W. Va., recently organized, has leased a building at Welch, W. Va., for a general machine shop and electrical repair works. Some equipment has been acquired from the Welch Armature Co. and other tools will be purchased. A. L. Smith is president.

Milwaukee

MILWAUKEE, March 24.

JUDGING by the consistency of inquiry, there is considerable machine-tool business in the foreground. Current sales form a moderate volume. The number of buyers is fairly large, but in few instances do purchases cover more than one or two items. Machine shops as a whole are busy and there is an increased demand for patternmakers and molders. Structural fabricators find business quiet.

The Holmquist Co., Chicago, manufacturer of wooden household utensils and general woodenware, has acquired a building at Burlington, Wis., and is buying additional equipment to supplement the machinery in the Chicago factory, which will be moved to Burlington about May 1. P. Clifton Holmquist is president and general manager.

The Lakeside Bridge & Steel Co., North Milwaukee, Wis., which is completing additions and installing supplemental equipment to bring its capacity up to 10,000 tons annually, has increased its authorized capitalization from $150,000 to $500,000. The capacity for manufacturing material handling equipment also has been increased. V. W. Coddington is president; S. C. Coddington, treasurer and general manager, and Charles G. Margwarth, vice-president and assistant manager.

Jesse L. Ferris, 627 South Sixth Street, LaCrosse, Wis., is organizing a company to manufacture three types of automatic steam valves, on the design of which he recently has been granted letters patent. It is believed likely that at the start only assembling operations will be conducted, but later the new concern expects to manufacture all parts as well.

The Anderson Motor Co., 36-38 West Second Street, Fond du Lac, Wis., has let the general contract to John Rosenbaum & Co., local, for a two-story brick and concrete automotive sales and service building, 45 x 122 ft., estimated to cost $30,000 with equipment.

The O. H. Kindt Mfg. Co., 1005 Twenty-eight Street, Milwaukee, will invest $60,000 in a new plant at Cedarburg and Hampton Roads for the manufacture of sash, doors and interior woodwork. The main building will be 60 x 120 ft., two stories, with wings for boiler room and dry kilns, 35 x 50 ft., and a warehouse. Inquiry is now being made for woodworking machinery, boilers, motors, etc. Otto H. Kindt is president.

Louis Odry, 1211 Packard Avenue, Cudahy, Milwaukee County, is taking bids through John Paulu, architect, St. Francis, Wis., for the construction of a public garage, sales and service building, 58 x 122 ft., part two stories and basement. It will cost about $25,000 complete.

At a special election, the city of L'Anse, Mich., adopted a bond issue of $54,000 to finance the construction and equipment of additions to the water supply and pumping plant. Arthur G. Ohman is city clerk.

The Wisconsin Metal Products Co., Racine, Wis., manufacturer of metal stampings, tools, dies, jigs, etc., will open bids March 31 for a new plant costing about $100,000. The main building will be 100 x 250 ft., one story and part basement, of brick and steel. Practically all new equipment is being purchased. The architect and engineer is Edmund B. Funston Co., Racine.

St. Louis

ST. LOUIS, March 24.

CONTRACT has been awarded by the Missouri Rubber Products Co., Kirkpatrick Building, St. Joseph, Mo., to the E. H. Lawhon Construction Co., for the erection of its proposed plant, to cost $350,000 with equipment.

O. A. Sommer, 800 North Third Street, St. Louis, is organizing a company to erect and operate a five-story automobile service and repair building at 719 Morgan Street, to cost approximately $200,000 with equipment.

W. F. Moody & Co., Little Rock, Ark., machinery dealers, have inquiries out for one 75 kva. electric generator, G. E. type, direct-connected to engine of Skinner type, with exciter, switchboard, and accessories.

The Crowell Fireproof Block Co., Kansas City, Mo., has acquired property in the vicinity of Forty-third Street, totaling about 75,000 sq. ft., for the erection of a new plant to manufacture fireproof blocks, etc., estimated to cost $50,000. Henry H. Crowell is head.

The Board of Education, Coldwater, Kan., has completed plans for a one-story manual training building at the local school, 35 x 72 ft., on which work will begin at once. Mann & Co., Rorabaugh-Wiley Building, Hutchinson, Kan., are architects.

The Quapaw Mining Corporation, Quapaw, Okla., is planning for the installation of electric hoisting equipment and other machinery at its properties.

The American Can Co., 120 Broadway, New York, is said to be contemplating the erection of an addition to its plant at Kansas City, Mo., to double approximately the present capacity, estimated to cost close to $500,000 with equipment.

The Kenyon Brick & Tile Co., Oklahoma City, Okla., has begun enlargements in its plant to develop a daily output of 50,000 brick and tile. The installation will include an electric-operated shovel for clay mining, electric hoists, mechanical drying and other equipment. Contracts for a portion of the apparatus have been placed and other awards will soon be made. A. W. Kenyon is president.

The Kansas City Power & Light Co., Fourteenth Street and Grand Avenue, Kansas City, Mo., will begin the erection of a one-story automatic power substation at Sixth and Penn Streets, 60 x 107 ft., to cost about $50,000 including equipment.

The City Council, Bartlesville, Okla., is arranging an appropriation of $1,000,000 for waterworks extensions and improvements, to include the installation of electric-operated pumping machinery. The Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

The Common Council, Columbia City, Mo., is contemplating the installation of an ice-manufacturing plant, to be municipally owned and operated.

The Central Power & Light Co., Chemical Building, St. Louis, operating power plants and systems in Arkansas, Oklahoma and Mississippi, is disposing of a bond issue of $800,000, to be used in part for extensions and the installation of additional equipment. Warner S. McCall is president.

The Common Council, Cushing, Okla., plans the installation of electric-operated pumping machinery in connection with proposed extensions to the water and sewerage systems, estimated to cost $500,000.

The Empire Refineries, Tulsa, Okla., contemplate the construction of two additional cracking units at its Ponca City, Okla., plant, to include two cracking, separating and concentrating chambers, five furnaces, three stacks and one relief cooler. Combined pump and receiving house, cooling tower and auxiliary equipment also will be purchased.

South Atlantic States

BALTIMORE, March 24.

THE Berkley Machine Works & Foundry Co., Berkley, Va., is rebuilding the portion of its machine shop recently destroyed by fire with loss of $25,000.

The Herfurth Engine & Machinery Co., Alexandria, Va., machinery dealer, has inquiries out for one oil-operated engine, about 50 hp., used, in good condition; also for a disk filter, International type, and for one ammonia compressor, inclosed type, about 8 x 8 in. or 8 x 9 in., belt-driven.

The Washington Suburban Sanitary Commission, T. Howard Duckett, chairman, 1420 New York Avenue, N. W., Washington, is said to have plans under advisement for the installation of electric-operated pumping machinery in connection with proposed extensions and improvements in the water and sewerage systems, Montgomery and Prince George Counties, Md., to cost $1,000,000. R. B. Morse, Hyattsville, Md., is chief engineer.

The Clinchfield Portland Cement Corporation, Kingsport, Tenn., will begin the construction of its proposed mill at Coreen, Ga., vicinity of Macon. A power house will be built and the majority of machinery will be operated with individual motor drive. The plant is estimated to cost $1,000,000 and will be ready for service in about ten months. John A. Miller is president, and E. G. Woodling, secretary.

The Southern Power Co., Charlotte, N. C., will increase

the height of the power dam at its Wateree, S. C., hydroelectric power plant, to provide for greater water head and the installation of additional equipment, estimated to cost $450,000.

Fire, March 18, destroyed the woodworking shop at the plant of the Penn-Seaboard Steel Corporation, New Castle, Del., with loss reported at $22,000. It is planned to rebuild. Headquarters are in the Franklin Bank Building, Philadelphia.

The Makepeace Box & Lumber Co., Inc., Sanford, N. C., has inquiries out for a Corliss engine, about 150 hp., with auxiliary equipment, for installation in its power house.

The general purchasing officer, Panama Canal, Washington, will take bids until April 14 for bolts, nuts, rivets, screws, valves, unions, air compressor, expansion joints, grindstones, etc., circular 1598; until March 31, for wire cloth, 3700 cable clips, 950 barrel bolts, 147 gross brass nuts, ring bolts, eye bolts, chain shackles, turnbuckles, etc., circular 2348.

The Glascock Stove & Mfg. Co., Greensboro, N. C., is purchasing property in Morehead Township as a site for a new plant, estimated to cost $75,000. T. A. Glascock heads the company.

Norman G. Smith & Co., Inc., Spruce Pine, N. C., affiliated with the Maine Feldspar Co., Brunswick, Me., is perfecting plans for the development of local clay properties and will install a clay refining plant, with steam-operated machinery.

The Chief of Air Service, United States Army, Washington, will take bids until March 31 for miscellaneous airplane parts, circular CAS 24-95; until March 31 for a quantity of pumping assemblies, drive shafts, fuel strainers, etc., circular CAS 24-98, and until April 7 for another quantity of spare airplane parts, circular CAS 24-96.

The O. L. Williams Veneer Co., High Point, N. C., plans for the erection of a three-story plant, 60 x 112 ft., for the manufacture of veneer panels and kindred specialties, estimated to cost $50,000 with machinery.

The General Reduction Co., Dry Branch, Ga., plans the installation of electric power and mechanical equipment on a tract of property near Macon, Ga., for the mining of Fuller's earth.

The Stockdell-Myers Hardware Co., Inc., Petersburg, Va., has inquiries out for one or more electric generators, about 300 kw. capacity, belt-driven, three-phase, a.c., 60 cycle, to generate at 440 or 2300 volts; also for one exhaust fan suitable for planing mill about 50 in. diameter; end trimmer, planer, and barrel-head jointer.

The purchasing agent, Government Printing Office, Washington, will take bids until April 7 for furnishing and installing a mechanical collection system for sawdust and shavings.

The Eastwick Motor Co., 120 West North Avenue, Baltimore, has filed plans for a one-story service and repair building at Remington Avenue and Twenty-ninth Street, 150 x 165 ft., for which a general contract has been let to the Consolidated Engineering Co., Calvert Building, estimated to cost $75,000.

The Taylor Marine Railway Co., Norfolk, Va., has tentative plans for rebuilding the portion of its machine and woodworking shops in the Brambleton section recently destroyed by fire with loss reported at $25,000 including equipment.

Gulf States

BIRMINGHAM, March 24.

THE Etie Sheet Metal Works, Inc., 1510 Washington Avenue, Houston, Tex., recently organized, will begin initial operations in a local building, 30 x 50 ft., for the manufacture of sheet metal goods. It is planned to erect an addition at an early date. W. R. Etie is president, and W. O. Olsen, secretary and treasurer.

The Western Agricultural Chemical Co., Mexia, Tex., is perfecting plans for a local plant to manufacture commercial fertilizer products, with initial unit, one-story 140 x 250 ft., to cost about $80,000 with machinery. V. G. Dawson is construction engineer for the owner.

The Florida Public Service Co., DeLand, Fla., is disposing of a bond issue of $1,350,000, a portion of the proceeds to be used for extensions in power plant and system. Lucien H. Tyng is president.

The Home Ice Co., Alexander City, Ala., recently formed with a capital of $30,000, has acquired the site of the former Alexander City Ice Co., and contemplates the erection of a new plant with electric-operated equipment, to cost $80,000.

Fire, March 11, destroyed a portion of the plant of the United States Machine Co., Electra, Tex., with loss estimated at $32,000 including equipment. It is planned to rebuild.

The Natchez Ice Co., Natchez, Miss., has begun the construction of an addition to its ice-manufacturing plant to increase the capacity. A new electric power unit will be installed with 100 hp. Diesel engine, with ice and refrigerating machinery.

The United States Engineer's Office, Florence, Ala., will take bids until April 22 for 58 structural steel regulating gates for installation at the Wilson Dam, Tennessee River, near Florence.

The Deepwater Coal & Iron Corporation, Jasper, Ala., recently organized under Delaware laws with capital of $1,000,000, has engaged Robert W. Hunt Co., 175 West Jackson Boulevard, Chicago, engineer, to make tests of its coal properties in Walker, Winston and Marion Counties, totaling 500,000 acres, and to prepare plans for development, mining, etc., including steel tipple, power house and machine shop. The project will involve close to $500,000. L. B. Musgrove, Jasper, is chairman of the board; Charles A. Meade is president, and Charles T. Lark, 527 Fifth Avenue, New York, secretary-treasurer, and general counsel.

The Ideal Laundry & Dry Cleaning Co., 1019 Travis Street, Shreveport, La., plans for the purchase of a gas engine, using natural gas as fuel, direct-connected to a 40 kw. generator, three-phase, 60-cycle, 200 volts.

The Atlantic Refining Co., Houston, Tex., has acquired 210 acres adjoining its terminals at Atreco, Tex., and plans for enlargements in the oil storage and distributing department, including the installation of pumping machinery, tanks, etc., estimated to cost $150,000. A tank farm will be established on a portion of the site.

The Common Council, Ennis, Tex., has authorized preliminary plans for the construction of a municipal electric light and power plant. C. A. Gilley is a member of the committee in charge.

The White Motor Truck Co., 842 East Seventy-ninth Street, Cleveland, has leased property at Dryades and Girod Streets, New Orleans, 100 x 200 ft., for the erection of a factory branch and service works, estimated to cost $160,000 with equipment. Moise Goldstein, New Orleans, is architect.

The Lassig Limestone Quarry, Inc., Grove and St. Charles Streets, McNeil, Tex., has arranged an appropriation for the installation of additional equipment, including electric power and other apparatus. O. J. Lassig is president and general manager.

The Central Iron & Coal Co., Holt, Ala., will proceed with the construction of an addition to its No. 3 pipe foundry, to double approximately its present capacity, with facilities for about 400 additional operatives.

The Fort Payne Light & Power Co., Fort Payne, Ala., will build a hydroelectric generating plant at Desoto Falls, near Little River, Ala., to cost $450,000 with machinery.

Manual training equipment will be installed in the three-story high school to be erected at Marshall, Tex., estimated to cost $200,000, for which plans have been drawn by W. G. Clarkson & Co., Fort Worth, Tex., architects.

R. L. Dowling & Son, Bradentown, Fla., have tentative plans for rebuilding the portion of their lumber mill and power house recently destroyed by fire with loss estimated at $300,000, of which close to $200,000 represents machinery.

The Western Public Service Co., Calvert, Tex., has acquired the electric power plant at Kosse, Tex., and electric power and ice plants of the Caldwell Electric & Ice Co., Caldwell, Tex. The first noted will be dismantled, while the Caldwell station will be remodeled and additional equipment installed. Paul Freeman is division superintendent.

The Florida Cooperative Machine Co., of which J. Heinze is executive officer, has purchased a site in North Birmingham and will erect a machine shop costing about $25,000, moving from Tampa, Fla., to this district.

Indiana

INDIANAPOLIS, March 24.

TENTATIVE plans are being considered by the Board of Directors, Indiana State Reformatory, Pendleton, Ind., for an addition to the institution to be used as a machine shop and woodworking department, estimated to cost $225,000 with equipment.

The Board of Education, Holton, Ind., is considering the installation of manual training equipment in the two-story and basement high school, estimated to cost $135,000, for which plans are being drawn by Karl P. Kenkel, Heinemann Building, Connersville, Ind., architect.

Edward C. Newton and Ernest G. Reece, Shelbyville, Ind., plan the construction of a steam-operated power house at their new canning plant at Flat Rock, Ind., estimated to cost $40,000 including equipment.

The Terre Haute, Indianapolis & Eastern Traction Co., Indianapolis, is planning for the installation of a wheel press at its shops, about 300 tons capacity.

The Wabash Portland Cement Co., Stroh, Ind., with offices in the Ford Building, Detroit, is arranging a list of equipment for installation in a proposed mill at Osborn, Ohio, to include three rotary cement kilns, 10 x 175 ft., power house, machine shop and other buildings, to cost approximately $1,500,000. A warehouse and distributing works will be built.

The Flat Rock Hydroelectric Power Co., represented by Clarence C. Shipp, Indianapolis, has filed application for permission to proceed with the erection of a hydroelectric generating plant on the Flat Rock River, near Shelbyville, Ind., to cost $600,000 with machinery. The Hoosier Hydro-electric Co., represented by John A. Shafer, engineer, Indianapolis, has also applied for permission to construct a hydro-electric station in the same section, with cost placed at about $500,000 with machinery.

The Indiana Electric Utilities Co., Angola, Ind., recently organized, will take over and consolidate a number of electric power companies in this section, including the Indiana Utilities Co., Angola, and the Economy Electric Co., in the same district. Plans are under way for expansion and the installation of additional equipment. Alphonso C. Wood, Angola, is representative.

Canada

TORONTO, March 24.

INQUIRIES for machine tools and equipment continue in good volume and while the greater part of buying has been confined to small lots, dealers and builders are figuring on two or three fair sized lists, chiefly for railroad shops. The Canadian National Railways and the Wabash are in the market for equipment for locomotive shops to be erected at St. Thomas, Ont. The Canadian National is also interested in equipment for other shops in eastern and western Canada, and the Canadian Pacific is said to be preparing lists for replacements needed at various shops.

The automotive industry is a steady customer, but orders from this source are chiefly for small quantities. Considerable inquiry has developed for waterworks, sewage and electrical equipment.

The Department of Trade and Commerce, Ottawa, Ont., has received the following information from D. H. Ross, Melbourne, Australia, regarding equipment required for the Victorian Railway Department and the New South Wales Railways: For the Victorian Railway Department, No. 36956, date of closing, April 30, supply and delivery of a battery of 1000 lb. and 1600 lb., drop hammers with all necessary accessories and one set of dies and tools. For the New South Wales Railways, No. 956, date of closing May 7, supply, delivery and erection of three electric overhead traveling cranes; No. 957, supply and delivery of electric train equipment for 150 motor cars and 150 trailers.

The Canadian National Railways, 230 St. James Street, Montreal, G. W. Caye, purchasing agent, and the Wabash Railway, Railway Exchange Building, St. Louis, Mo., T. J. Frier, purchasing agent, are in the market for equipment for locomotive shops to be erected at St. Thomas, Ont., at a cost of $220,000.

J. Patterson, Manotick, Ont., is in the market for a drill press and grinder.

Bids are being received by Ernest F. Webb, City Clerk, Prince Albert, Sask., until May 15 for the supply and erection of one 1500 kw. steam turbine generator and condenser complete.

J. E. Saunders, Osgoode Station, Ont., is in the market for a bench drill, forge with hood, blower, etc.

C. Galbraith, North Augusta, Ont., is in the market for a bench grinder and drill.

G. Raycroft, Cardinal, Ont., is in the market for a drill press and lathe.

James Brothers, Herriott Street, Perth, Ont., are asking for prices and information on molding machines, ladles, lathes and other equipment for proposed foundry addition.

The Lachine Welding & Nickel Plating Co., 129 First Avenue, Lachine, Que., is in the market for a welding machine and other equipment. P. Carmoni is purchasing agent.

The Tudhope Anderson Co., Orillia, Ont., propose to install electric spot welding and stove-top polishing machines. Prices on this and other equipment are being received by F. Hindle, superintendent.

The Canadian Pacific Railway Co. will shortly call for bids for the construction of an engine house at Schreiber, Ont., to cost $150,000, to replace a plant recently destroyed by fire.

The St. Maurice Paper Co., Cap de la Madeleine, Que., has started work on the erection of a machine shop to cost $500,000. Considerable machinery and tools are still to be purchased.

The Ottawa Hydro Electric Commission, 75 Laurier Avenue, Ottawa, Ont., is receiving bids for transformers, meters, wire and general electric supplies.

The United Power Co., 390 Philips Place, St. Michel, Que., contemplates an addition to the power plant to cost $20,000.

W. W. Hiltz, mayor, chairman of the Board of Control, Toronto, will receive bids until May 13 on the following: Tender No. 45, 25,000,000 Imperial gal. centrifugal pump and steam turbine; tender No. 44, 30-in. stop valves; tender No. 43, 30-in. cast iron pipe. Specifications and forms of tender with the Works Department, 12 City Hall.

Improvements involving an expenditure of $140,000 by the Canadian National Railways to the roundhouse and coal chutes at Stratford, Ont., have been authorized. Construction will start this spring.

Pacific Coast

SAN FRANCISCO, March 19.

PLANS are being prepared for a new steam-operated electric power plant by the Ontario Power Co., Ontario, Cal., estimated to cost $100,000 with equipment. Glenn D. Smith is general manager.

The Fisher-McGaffney Body Co., San Francisco, will take bids at once for a two-story plant, 113 x 150 ft., at Tenth and Howard Streets, to cost about $80,000 including equipment. Willis Lowe, Monadnock Building, is architect.

The Southern California Edison Co., Los Angeles, has decided upon a fund of $26,000,000 for extensions and improvements in its plants and system during the year, including the installation of additional machinery at its Big Creek Nos. 1 and 2 hydroelectric generating stations; the proposed steam-operated generating plant at Long Beach, Cal.; construction of new automatic power substations and steel tower transmission lines. The company is disposing of a bond issue of $14,000,000, a portion of the fund to be used for the appropriation.

The Bowman-Hicks Lumber Co., La Grande, Ore., is planning for extensions in its mill to cost about $100,000, including the installation of additional machinery, electrically-operated.

The Illinois Wire & Cable Co., Sycamore, Ill., has engaged Willis Lowe, Monadnock Building, San Francisco, architect, to prepare plans for its proposed works at Oakland, Cal., to cost approximately $250,000 with machinery, instead of a lesser amount previously noted. It is expected to ask bids for the first unit early in April, estimated to cost $50,000.

The Lincoln Ice Co., Los Angeles, has begun the construction of a new ice-manufacturing plant at 1737 West Albion Street. The initial machinery will include an ice machine with daily capacity of 65 tons; two 100 hp. boilers and auxiliary apparatus; elevating and conveying machinery, etc. It will cost about $100,000. Hamm & Grant, 607 Ferguson Building, are engineers.

The Sinclair Refining Co., 111 West Washington Street, Chicago, will begin the construction of a new oil storage and distributing plant near Hillyard, Wash., estimated to cost $150,000 with machinery.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has authorized plans for additions in its automatic power substation at Vacaville, Cal., estimated to cost $850,000. The work will include the installation of a new unit to handle 100,000 hp. from the new hydroelectric generating plant now in course of construction on the Pit River, Shasta County.

The Incello Co., San Louis Obispo, Cal., recently organized with a capital of $1,000,000, will take over the local plant and business of the United States Refractories Co., heretofore operating with a capital of $200,000. Plans are under way for enlargement. C. H. Kamm is president; and W. H. Emory, vice-president and general manager.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.
Steel plates, ¼ in. and heavier	3.64c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅝ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten	75c. to 80c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.60c.	.....
Nos. 22 and 24	4.70c. to 4.75c.	5.10c.
No. 26	4.75c. to 4.80c.	5.15c.
No. 28*	4.85c. to 4.90c.	5.25c.
No. 30	5.05c. to 5.10c.	.....

Galvanized

	Per Lb.
No. 14	4.95c. to 5.00c.
No. 16	5.10c. to 5.15c.
Nos. 18 and 20	5.25c. to 5.30c.
Nos. 22 and 24	5.40c. to 5.45c.
No. 26	5.55c. to 5.60c.
No. 28*	5.85c. to 5.90c.
No. 30	6.30c. to 6.35c.

*No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—41	—24	⅛ in. Butt...	— 4	+19
¼ in. Butt...	—46	—32	¼ in. Butt...	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap....	— 5	+14
7-8 in. Lap..	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap..	—34	— 6	7-12 in. Lap..	— 3	+16

Bolts and Screws

Machine bolts, cut thread, 45 and 10 to 50 and 10 per cent off list

Carriage bolts, cut thread, 35 to 35 and 10 per cent off list

Coach screws ..... 45 to 50 and 10 per cent off list

Wood screws, flat head iron, 75, 20, 10 and 7½ per cent off list

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.50c. to 4.75c.
Annealed soft	4.50c. to 4.75c.
Galvanized annealed	5.15c. to 5.40c.
Coppered basic	5.15c. to 5.40c.
Tinned soft Bessemer	6.15c. to 6.40c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18¼c. to 19¼c.
High brass wire	18¾c. to 19¾c.
Brass rods	16 c. to 17 c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	22½c. to 23½c.
Copper tube, seamless	23¾c. to 24¾c.

Copper Sheets

Sheet copper, hot rolled, 21¾c. to 22¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Prime	Seconds
			80 lb..	$6.55	$6.30
			90 lb..	6.65	6.40
			100 lb..	6.75	6.50
IC..	$11.75	$9.50	IC..	7.00	6.75
IX..	13.25	11.50	IX..	8.25	8.00
IXX..	14.50	12.50	IXX..	9.50	9.25
IXXX..	15.50	13.75	IXXX..	10.75	10.50
IXXXX..	16.50	14.75	IXXXX..	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	62c.
Bar	68c. to 70c.

Copper

Lake ingot	15½c.
Electrolytic	15 c.
Casting	14 c.

Spelter and Sheet Zinc

Western spelter	8c.
Sheet zinc, No. 9 base, casks	10¾c. open 11½c.

Lead and Solder*

American pig lead	11c. to 12c.
Bar lead	14c. to 15c.
Solder ½ and ½ guaranteed	40c.
No. 1 solder	38c.
Refined solder	34c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	13c. to 14c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

Demand is erratic and values uncertain because of the change in the new metal market. Dealers' buying prices are as follows:

	Cents Per Lb
Copper, heavy crucible	11.50
Copper, heavy wire	10.75
Copper, light bottoms	9.25
Brass, heavy	6.50
Brass, light	5.25
Heavy machine composition	9.00
No. 1 yellow brass turnings	7.00
No. 1 red brass or composition turnings	8.25
Lead, heavy	7.50
Lead, tea	5.75
Zinc	4.00
Cast aluminum	17.00
Sheet aluminum	17.00